CHAPTER 30

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE

NONE

CHAPTER 30

ICE AND RAIN PROTECTION

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ICE AND RAIN PROTECTION

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Cleaning/Painting		701	ALL
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Fault Isolation		101	ALL
Adjustment/Test		501	ALL
MOTOR/CONVERTER - LEFT	30-44-01		
Removal/Installation		401	ALL
MOTOR/CONVERTER - RIGHT	30-44-02		
Removal/Installation		401	ALL
ADAPTER - MOTOR	30-44-03		
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ARM - WINDSHIELD WIPER	30-44-05		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
BLADE - WINDSHIELD WIPER	30-44-07		
Removal/Installation		401	ALL
Inspection/Check		601	ALL

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	VHF ANTENNA ANTI-ICE SYSTEM	30-51-00		
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	Fault Isolation		101	001-031 WITHOUT SB30-043
	Adjustment/Test		501	001-031, WITHOUT SB30-043
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	Maintenance Practices		201	001-031, WITHOUT SB30-043
	Removal/Installation		401	001-031, WITHOUT SB30-043

Subject	Chapter Section Subject	Page	Effectivity
WATER LINES	30-70-00		
WATER SUPPLY/DRAIN LINE HEATERS	30-71-00		
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Fault Isolation		101	ALL
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Adjustment/Test		501	CONFIG 2 025, 026, 028-999
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HEATERS - POTABLE WATER LINE	30-71-06		
Removal/Installation		401	ALL
HEATER - DRAIN MAST	30-71-10		
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R Removal/Installation		401	001-031
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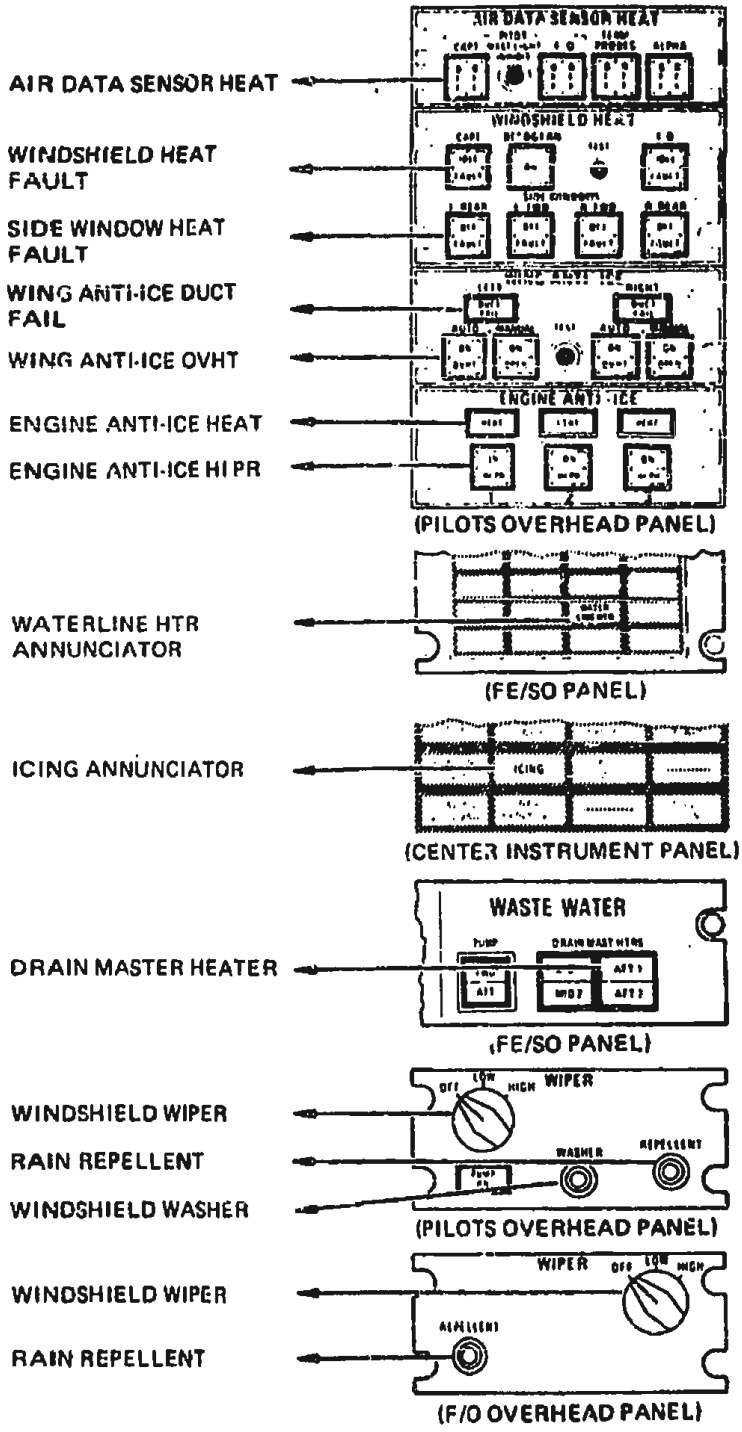

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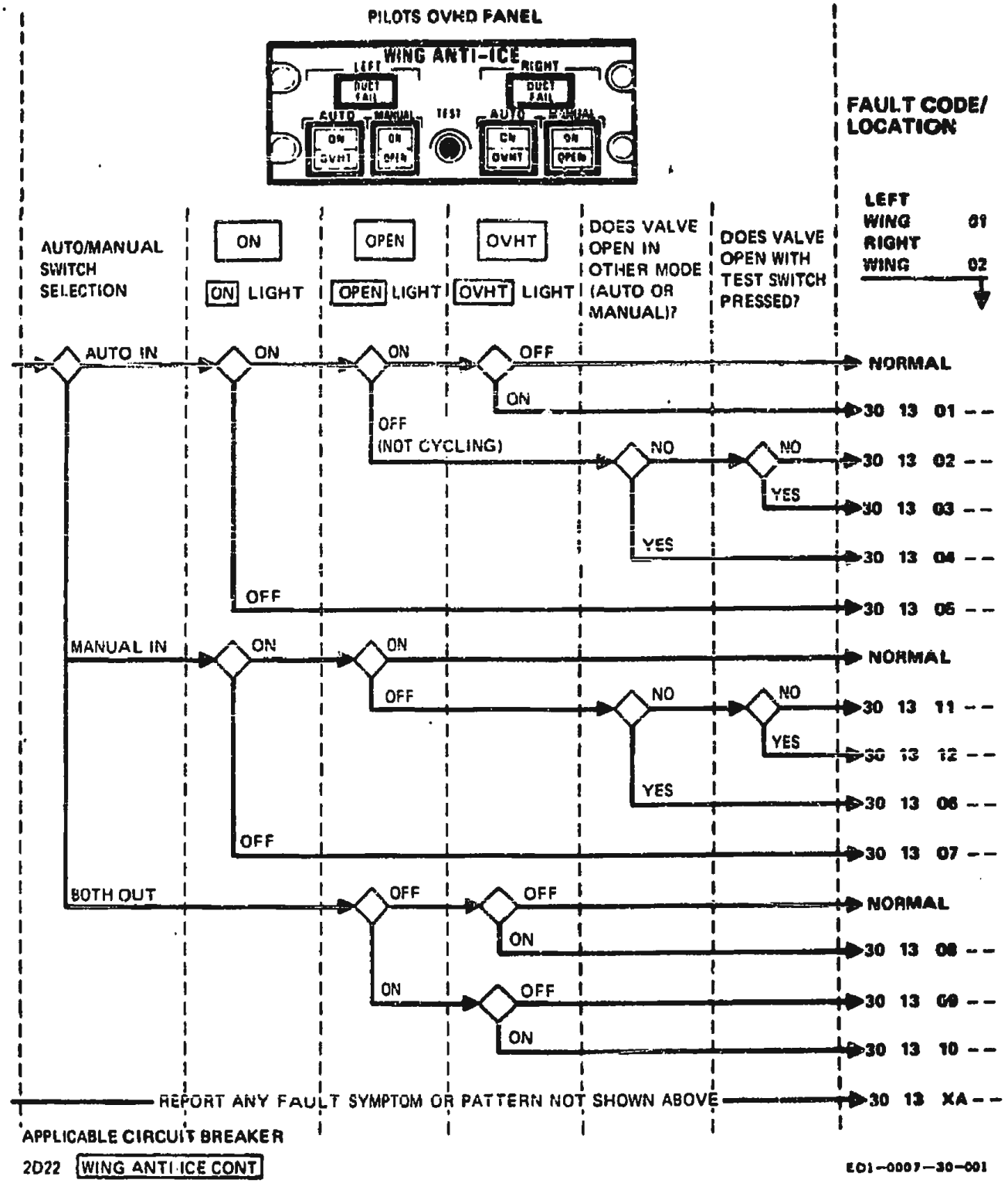
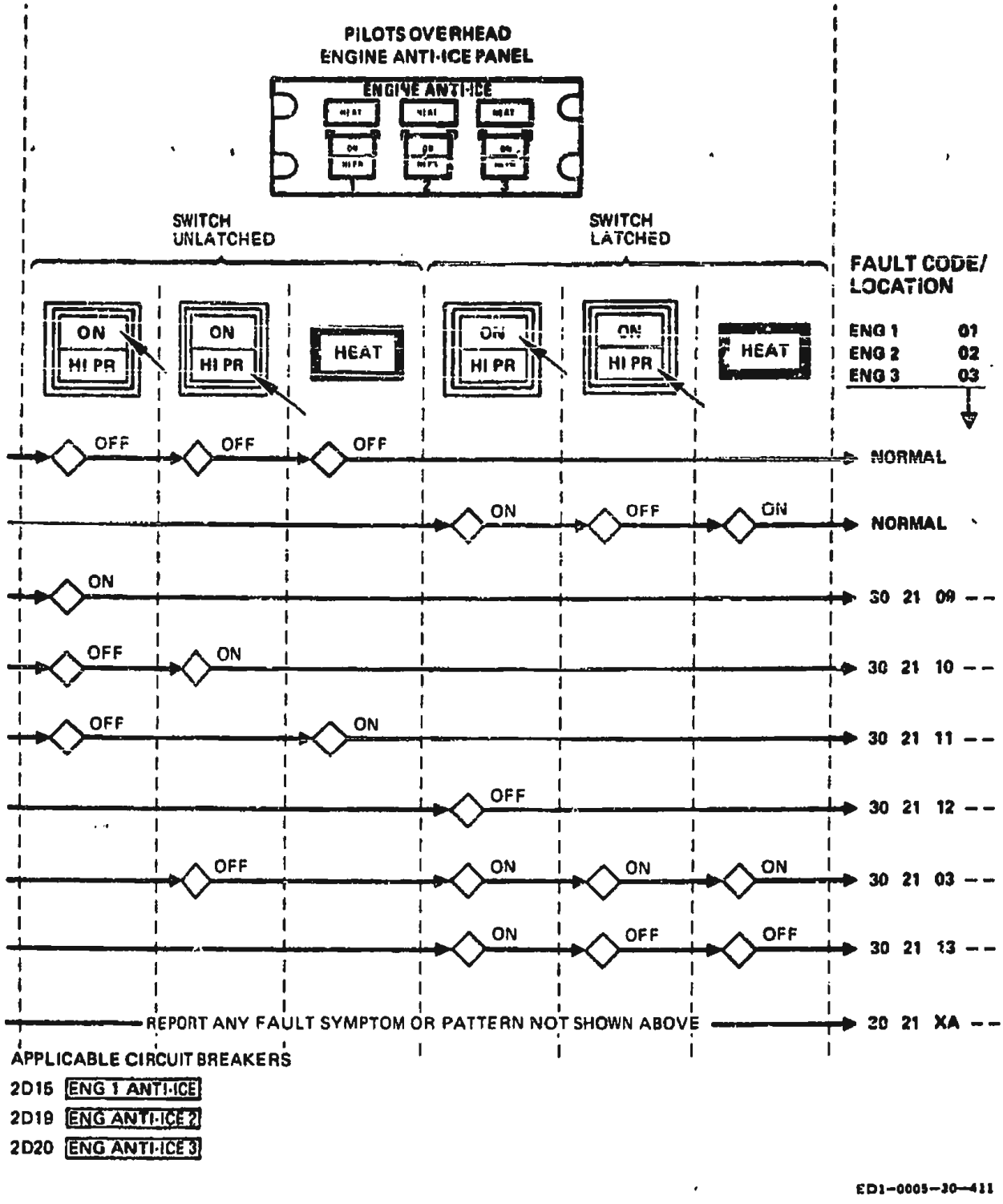


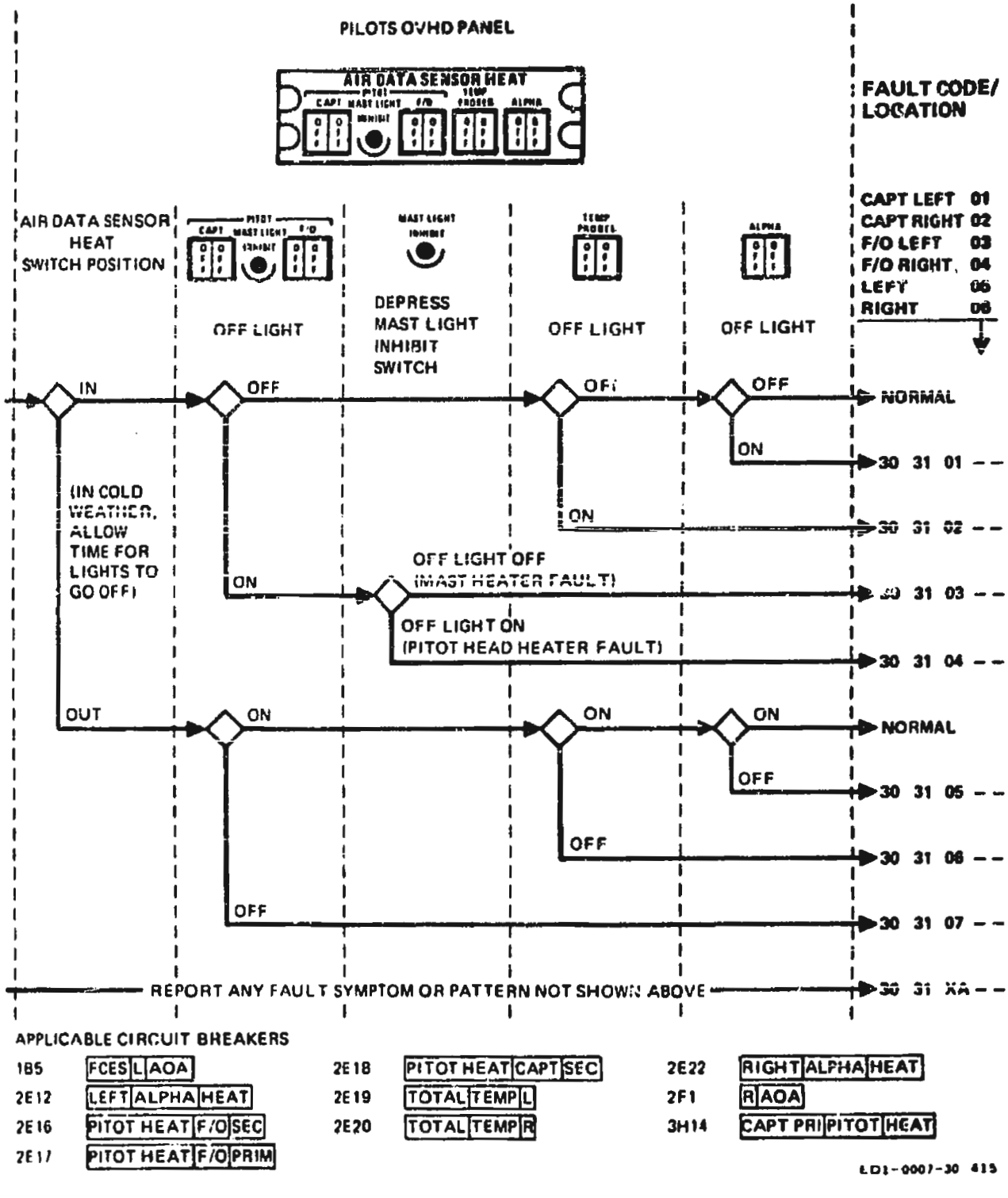
R Wing Anti-Ice FAULT - Fault Codes
Figure 1

EFFECTIVITY: ALL

30-FAULT CODE DIAGRAM



R Engine Anti-Ice Fault - Fault Codes
Figure 2



APPLICABLE CIRCUIT BREAKERS

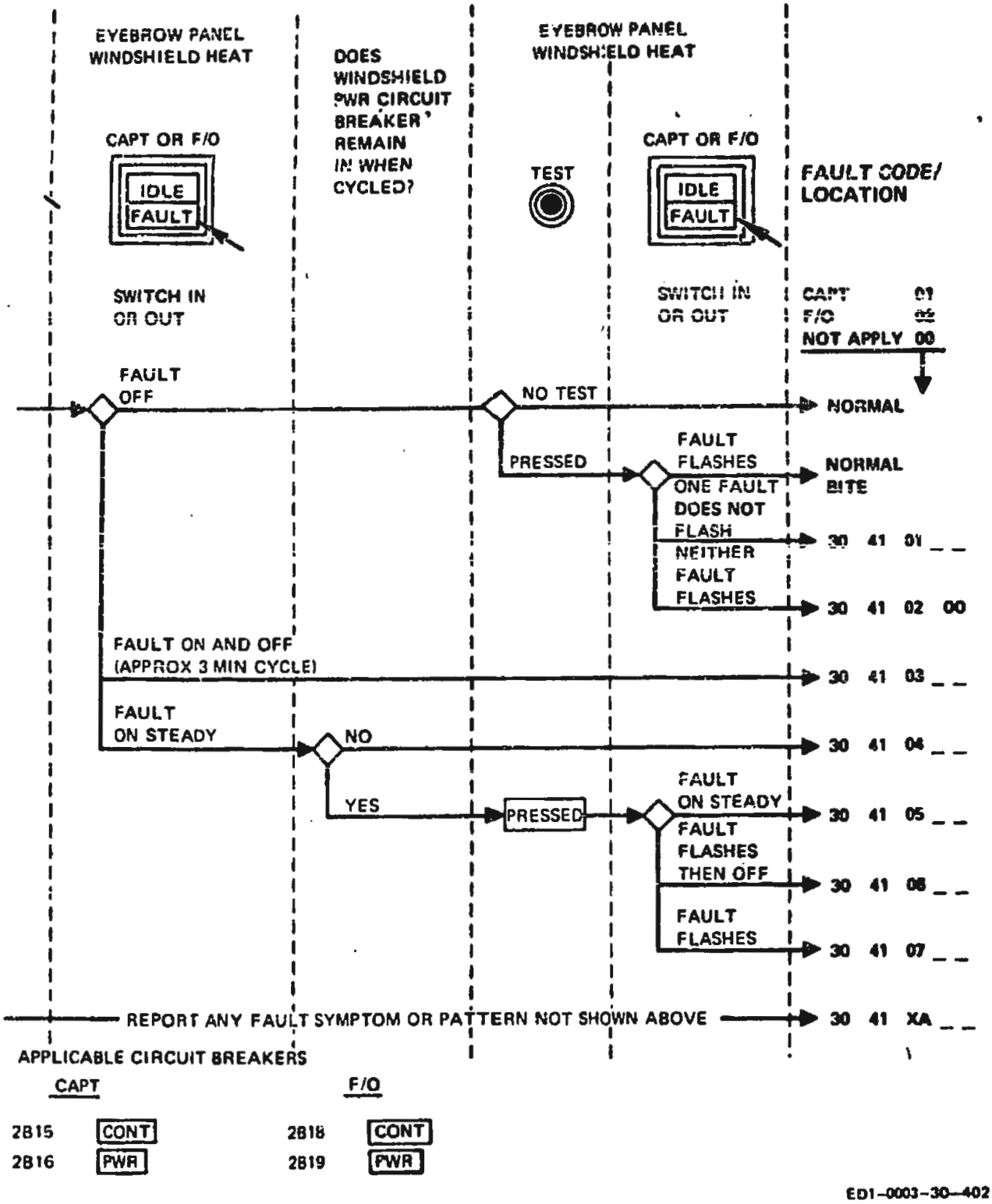
185	FCES L AOA	2E18	PITOT HEAT CAPT SEC	2E22	RIGHT ALPHA HEAT
2E12	LEFT ALPHA HEAT	2E19	TOTAL TEMP L	2F1	R AOA
2E16	PITOT HEAT F/O SEC	2E20	TOTAL TEMP R	3H14	CAPT PRI PITOT HEAT
2E17	PITOT HEAT F/O PRIM				

LD1-0007-30 415

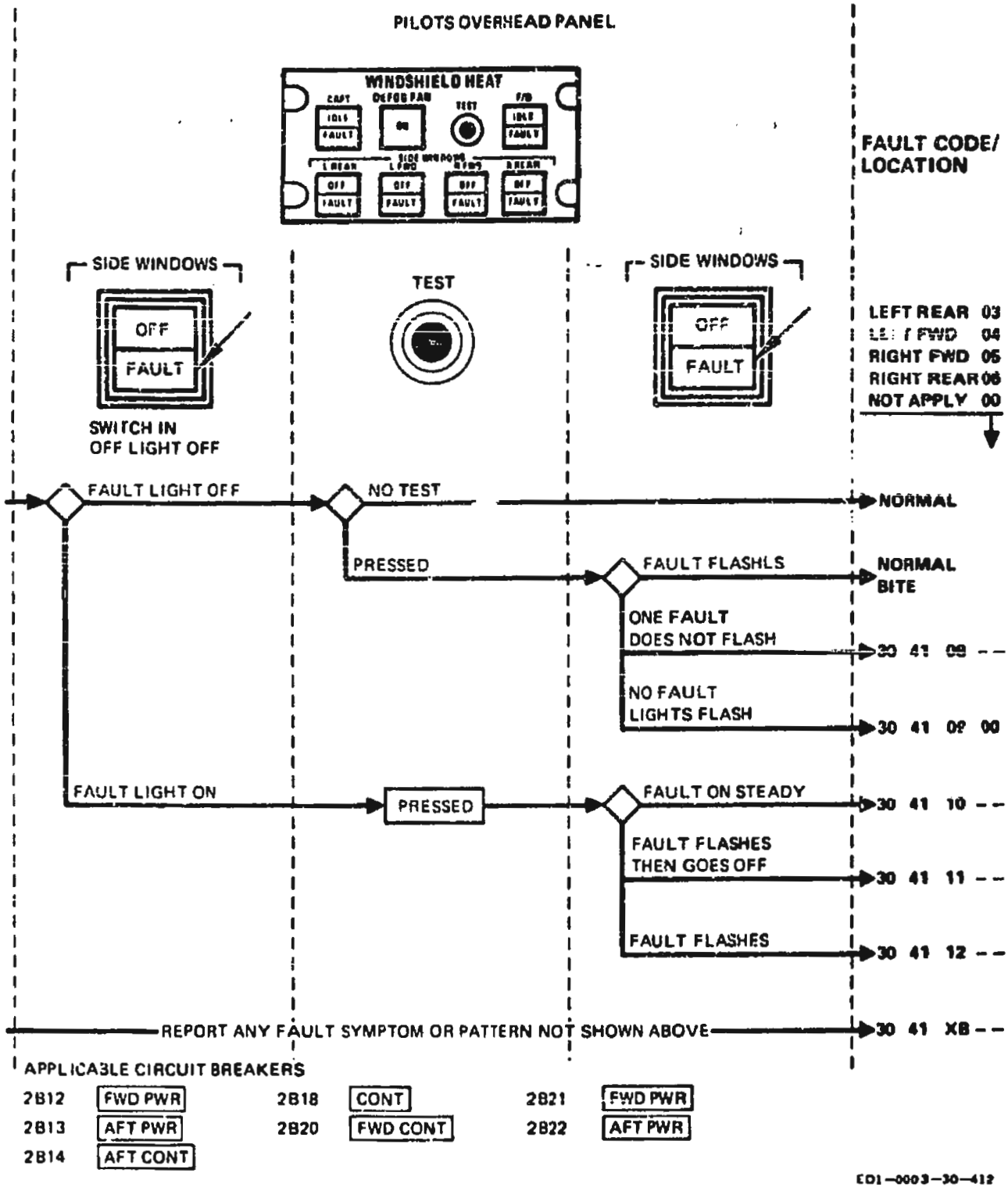
R Air Data Sensor Heat - Fault Codes
Figure 3

EFFECTIVITY: ALL

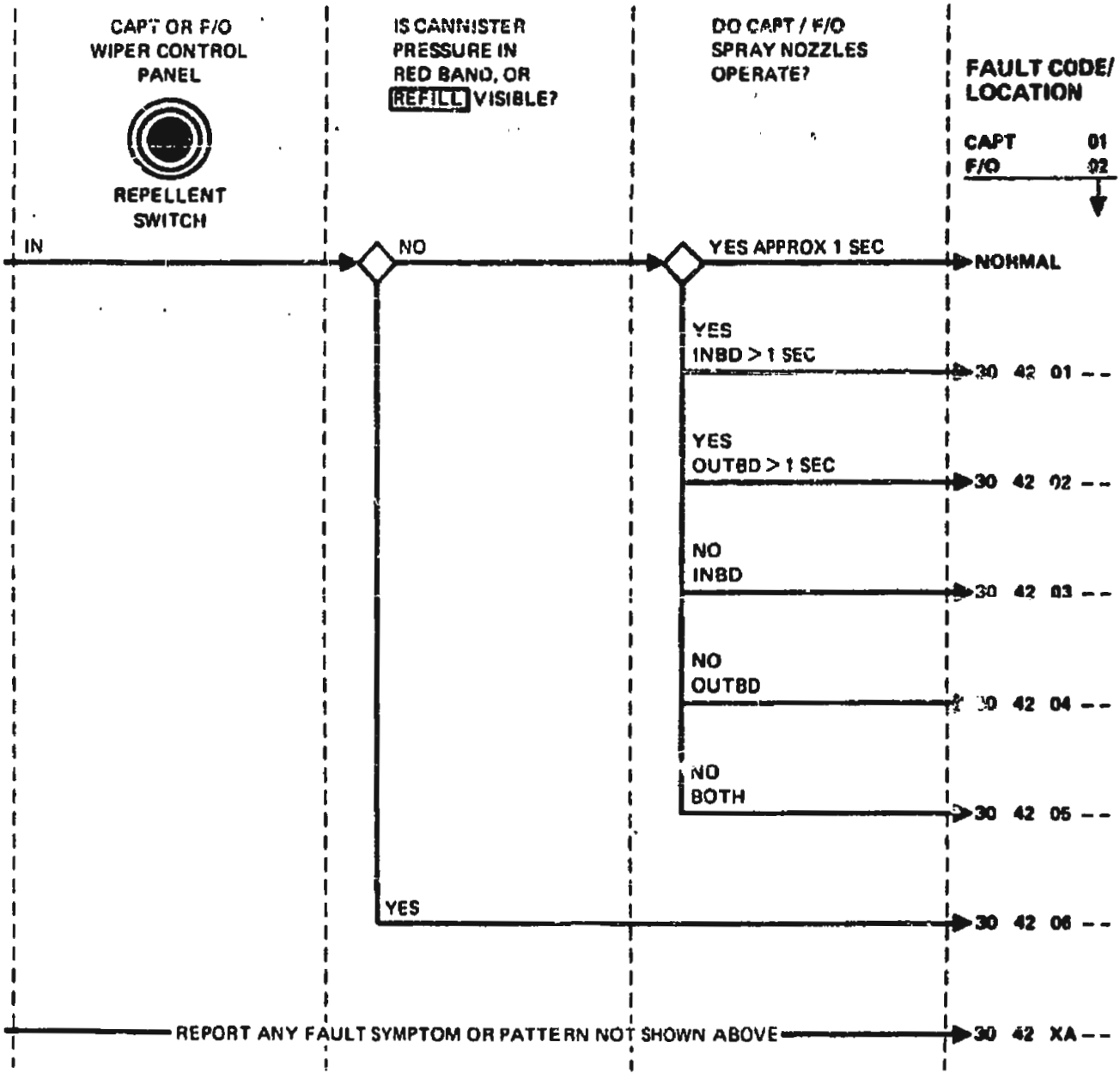
30-FAULT CODE DIAGRAM



R Windshield Heat - Fault Codes
Figure 4



R Side Window Heat - Fault Codes
Figure 5


CAPT OR F/O WIPER CONTROL PANEL
REPELLENT SWITCH
IS CANNISTER PRESSURE IN RED BAND, OR REFILL VISIBLE?
DO CAPT / F/O SPRAY NOZZLES OPERATE?
FAULT CODE/ LOCATION
CAPT 01
F/O 02
IN
NO
YES APPROX 1 SEC
NORMAL
YES INBD > 1 SEC
30 42 01 - -
YES OUTBD > 1 SEC
30 42 02 - -
NO INBD
30 42 03 - -
NO OUTBD
30 42 04 - -
NO BOTH
30 42 05 - -
YES
30 42 06 - -
REPORT ANY FAULT SYMPTOM OR PATTERN NOT SHOWN ABOVE
30 42 XA - -

APPLICABLE CIRCUIT BREAKERS

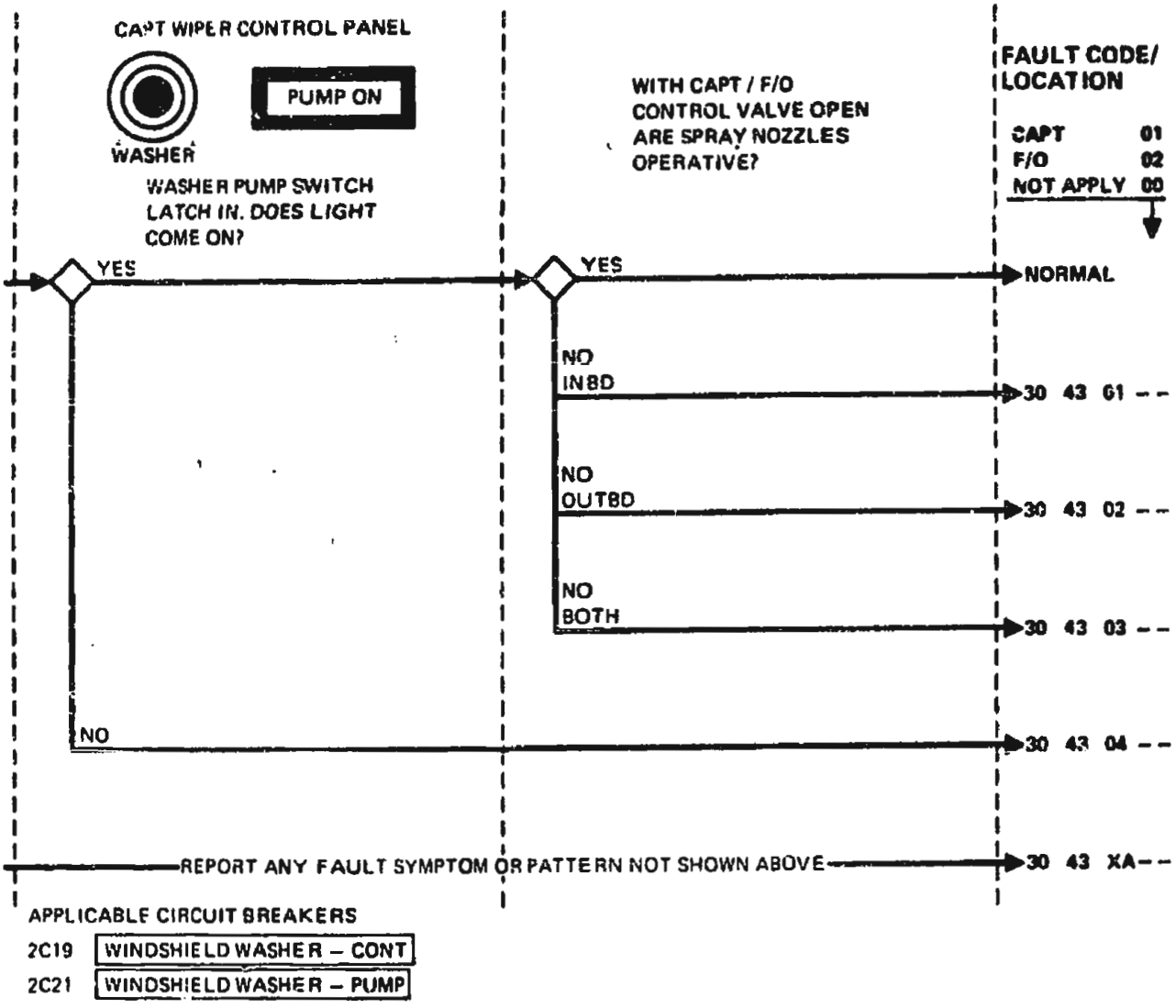
1L1	RAIN REPELLENT INBD
1L2	RAIN REPELLENT OUTBD

ED1-0001-30-034

R Rain Repellent System - Fault Codes
Figure 6

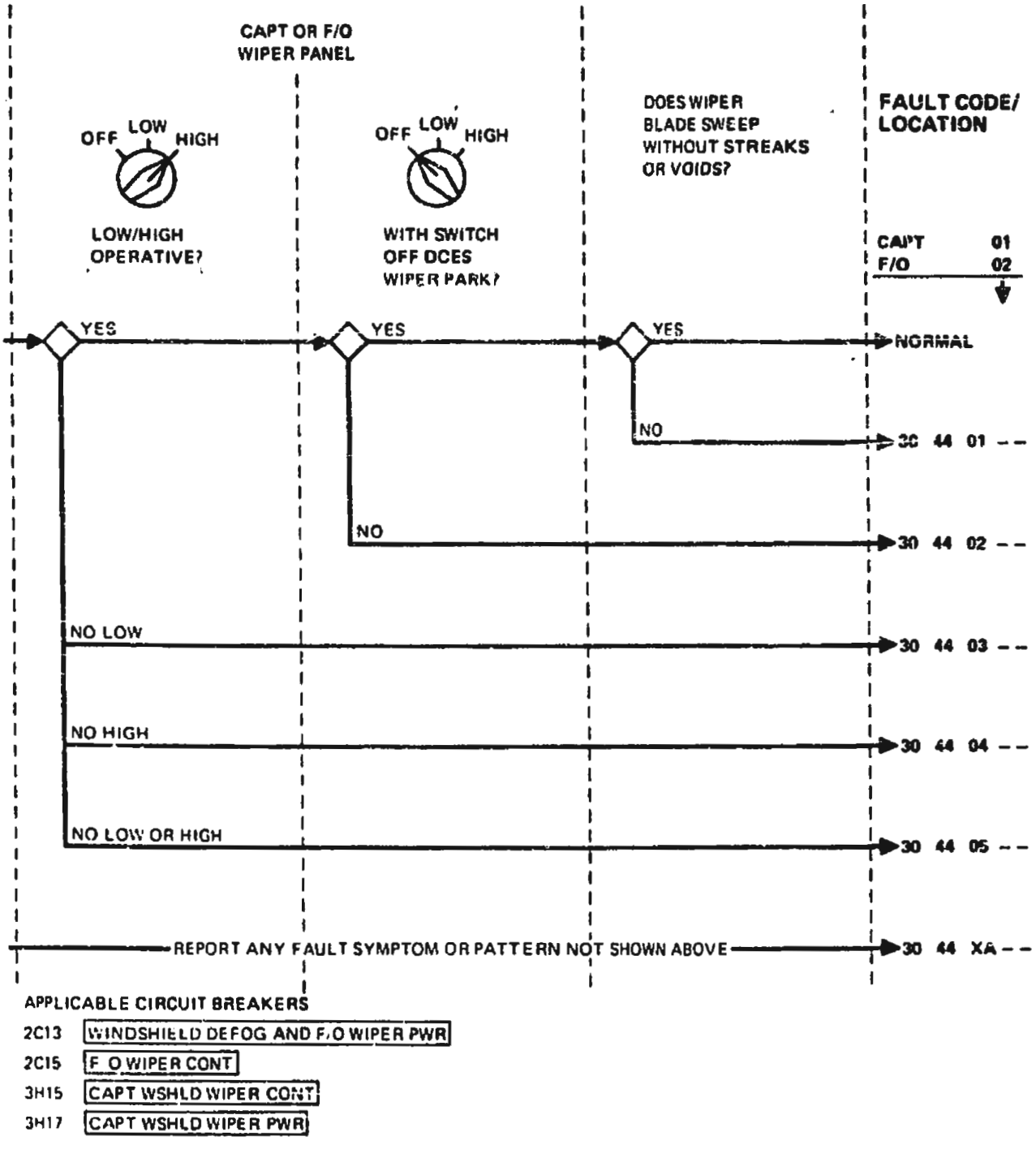
EFFECTIVITY: ALL

30-FAULT CODE DIAGRAM



EDI-0001-30-035

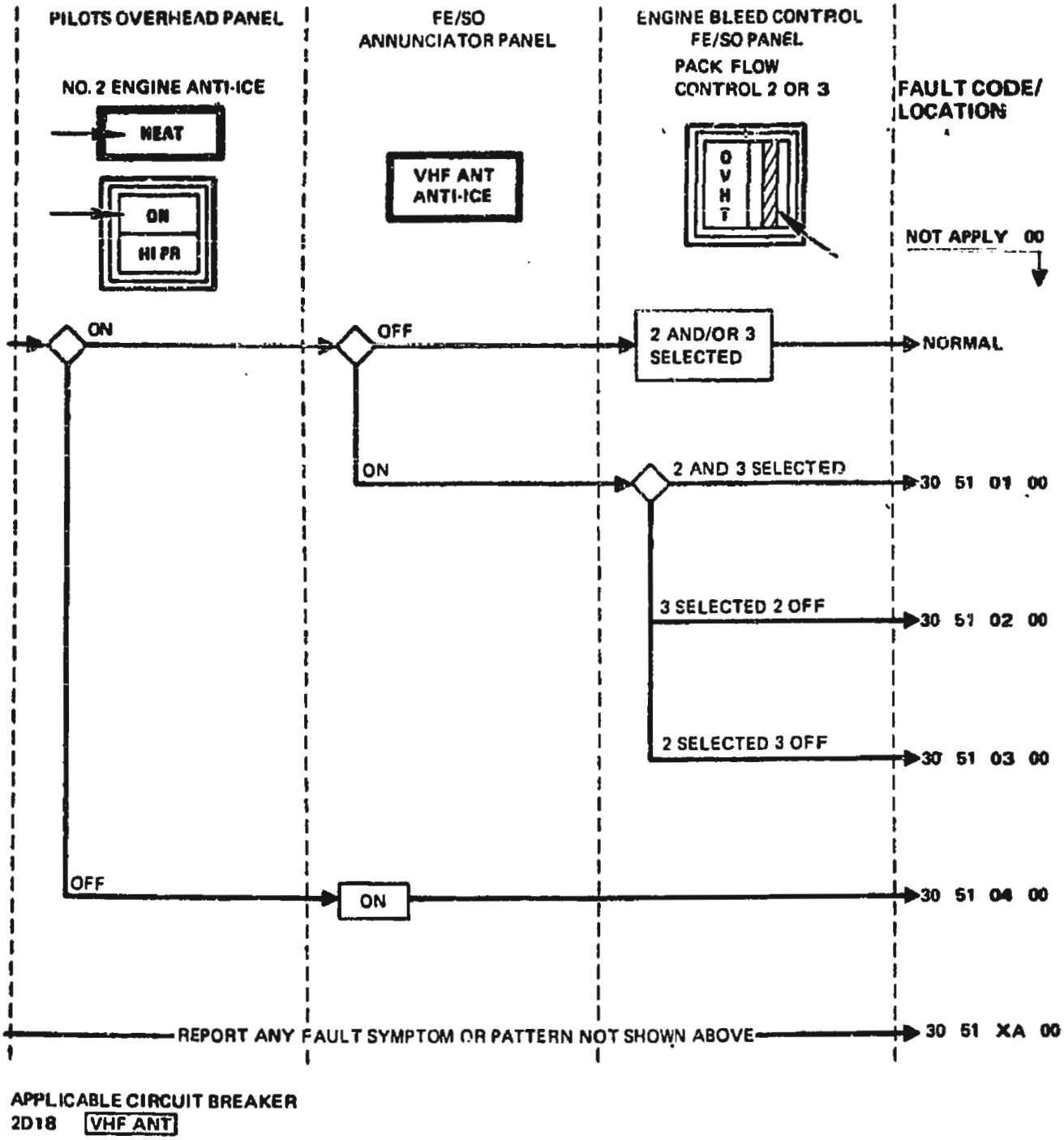
R Windshield Washer System - Fault Codes
Figure 7



R Windshield Wiper System - Fault Codes
Figure 8

EFFECTIVITY: ALL

30-FAULT CODE DIAGRAM



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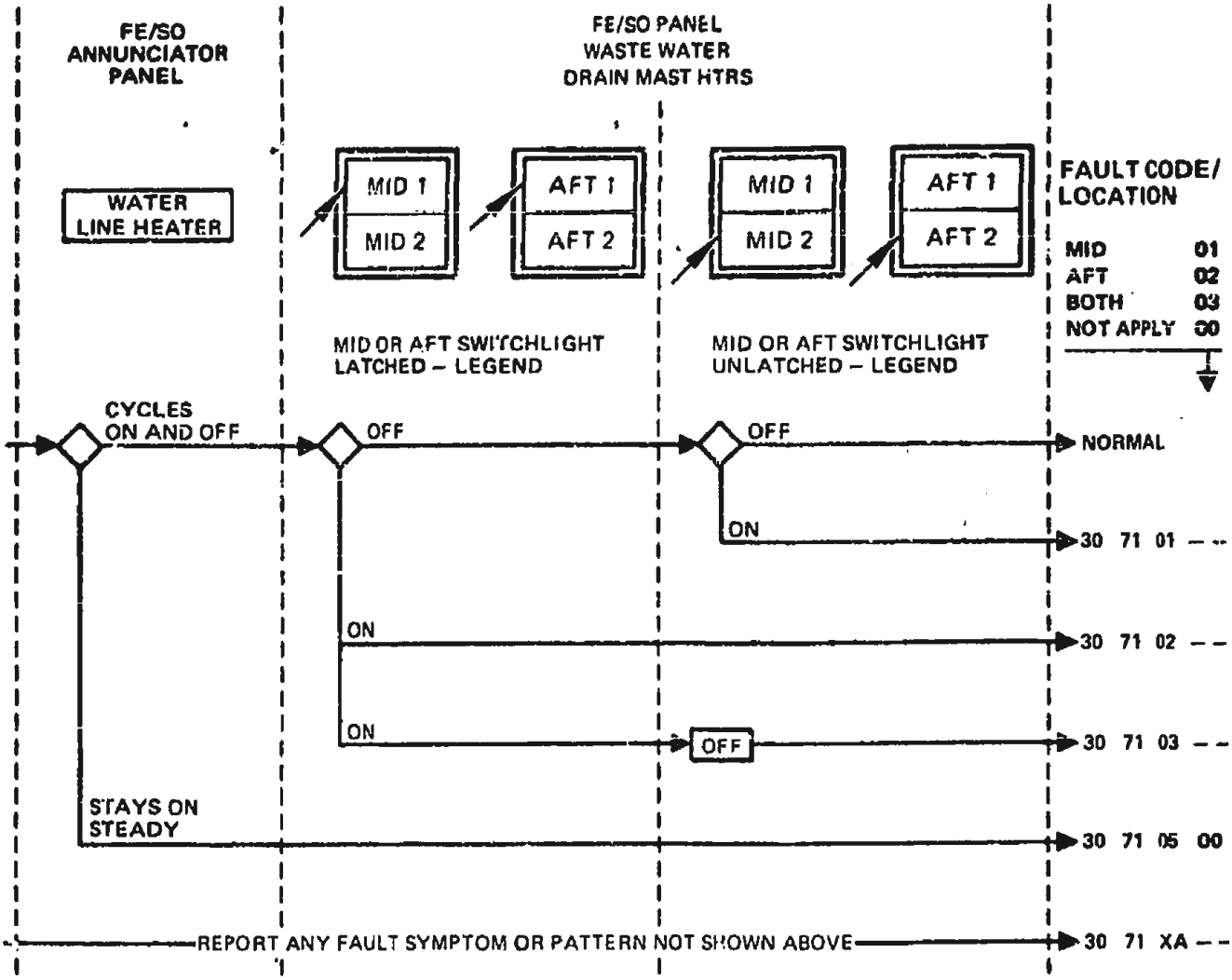
R VHF ANT ANTI-ICE Annunciator - Fault Codes
Figure 9



APPLICABLE CIRCUIT BREAKERS

2E13	DRAIN MAST HEATER	CONT
2E14	DRAIN MAST HEATER	AFT
2E15	DRAIN MAST HEATER	MID

GALLEY RIGHT CB PANEL

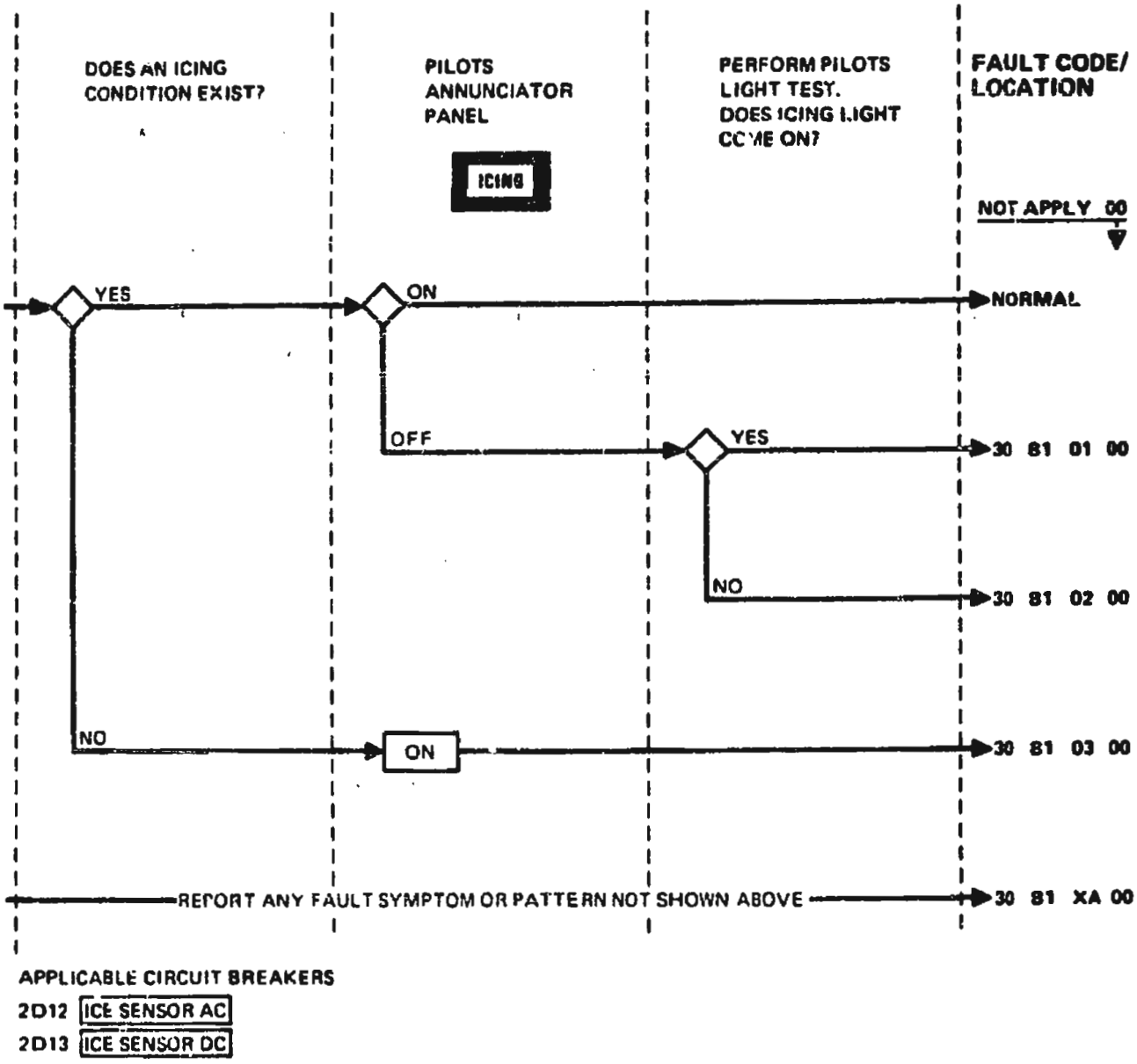
D6	WATER SYS	HEATER
	WATERLINE	FWD
D7	WATER SYS	HEATER
	WATERLINE	AFT

GALLEY LEFT CB PANEL

G20	LIGHTING WATER	
	SVCE PNL	

ED1-0006-30-410

R Waterline and Drain Mast Heaters - Fault Codes
Figure 10



EDI-0003-30-413

R ICING Annunciator - Fault Codes
Figure 11

R EFFECTIVITY: ALL

R

0508

30-FAULT CODE DIAGRAM

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 13 XA __	1. A Wing Anti-Ice FAULT fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 30-13-00 Fig. 103 (Sheet 1) Block 1
30 21 XA __	1. An Engine Anti-Ice Fault fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-21-00 Fig. 103 Block 1
30 31 XA __	1. An Air Data Sensor Heat fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-31-00 Fig. 103, 104, 105 Block 1
30 41 XA __	1. A Windshield Heat fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-41-00 Fig. 103, 105 Block 1
30 41 XB __	1. A Side Window Heat fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-41-00 Fig. 104, 105 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 42 XA __	1. A Rain Repellent System fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-42-00 Fig. 103 Block 1
30 43 XA __	1. A Windshield Washer System fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-43-00 Fig. 103 Block 1
30 44 XA __	1. A Windshield Wiper System fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-44-00 Fig. 103 Block 1
30 51 XA 00	1. A VHF ANT ANTI-ICE Annunciator fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-51-00 Fig. 103 Block 1
R 30 71 XA __	1. A Waterline and Drain Mast Heaters fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
R	2. 30-71-00 Fig. 104 Block 1
30 81 XA 00	1. An ICING Annunciator fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.)
	2. 30-81-00 Fig. 103 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 13 01 __	1. (01=Left, 02=Right) wing anti-ice OVHT light on with switch in AUTO.
	2. 30-13-00 Fig. 103 Block 5
30 13 02 __	1. (01=Left, 02=Right) wing anti-ice OPEN light does not come on with AUTO switchlight in.
	2. 30-13-00 Fig. 103 Block 9
R 30 13 03 __ R R R	1. (01=Left, 02=Right) wing anti-ice OPEN light does not come on with AUTO switchlight in. Wing anti-ice OPEN light comes on with TEST switch depressed.
	2. 30-13-00 Fig. 103 Block 1
30 13 04 __	1. (01=Left, 02=Right) wing anti-ice OPEN open light does not come on in AUTO; OK in MANUAL.
	2. 30-13-00 Fig. 103 Block 17
30 13 05 __	1. (01=Left, 02=Right) wing anti-ice ON light does not come on with AUTO.
	2. 30-13-00 Fig. 103 Block 1
30 13 06 __	1. (01=Left, 02=Right) wing anti-ice OPEN light does not come on in MANUAL; OK in AUTO.
	2. 30-13-00 Fig. 103 Block 14
30 13 07 __	1. (01=Left, 02=Right) wing anti-ice ON light does not come on with MANUAL switch in.
	2. 30-13-00 Fig. 103 Block 3
30 13 08 __	1. (01=Left, 02=Right) wing anti-ice OVHT light on with both switches out.
	2. 30-13-00 Fig. 103 Block 11

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 13 09 __	1. (01=Left, 02=Right) wing anti-ice OPEN light on with both switches out.
	2. 30-13-00 Fig. 103 Block 6
30 13 10 __	1. (01=Left, 02=Right) wing anti-ice OPEN and OVHT lights on with both switches out.
	2. 30-13-00 Fig. 103 Block 6
30 13 11 __	1. (01=Left, 02=Right) wing anti-ice OPEN light does not come on with MANUAL switchlight on.
	2. 30-13-00 Fig. 103 Block 9
30 13 12 __	1. (01=Left, 02=Right) wing anti-ice OVHT light on with MANUAL switchlight in.
	2. 30-13-00 Fig. 103 Block 1
30 21 01 00	1. NOT USED.
30 21 02 00	1. NOT USED.
R 30 21 03 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Anti-Ice ON, HI PR and HEAT lights on with switch latched. HI PR light off with switch unlatched.
R	2. 30-21-00 Fig. 103 (Sheet 2) Block 9
30 21 04 00	1. NOT USED.
30 21 05 00	1. NOT USED.
30 21 06 00	1. NOT USED.
30 21 07 00	1. NOT USED.
30 21 08 00	1. NOT USED.

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 21 09 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Anti-Ice ON light on with switch unlatched.
	2. 30-21-00 Fig. 103 (Sheet 1) Block 4
30 21 10 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Anti-Ice ON light off, HI PR light on with switch unlatched.
	2. 30-21-00 Fig. 103 (Sheet 1) Block 4
30 21 11 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Anti-Ice ON light off, HEAT light on with switch unlatched.
	2. 30-21-00 Fig. 103 (Sheet 1) Block 5
30 21 12 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Anti-Ice ON light off with switch latched.
	2. 30-21-00 Fig. 103 (Sheet 1) Block 10
30 21 13 __	1. (01=Eng 1, 02=Eng 2, 03=Eng 3) Anti-Ice ON light on HI PR and HEAT lights off with switch latched.
	2. 30-21-00 Fig. 103 (Sheet 2) Block 3
30 31 01 __	1. (05=Left, 06=Right) ALPHA heater OFF light on with switch in.
	2. 30-31-00 Fig. 103 Block 1
30 31 02 __	1. (05=Left, 06=Right) TEMP PROBES heater OFF light on with switch in.
	2. 30-31-00 Fig. 104 Block 3
30 31 03 __	1. (01=Capt Left, 02=Capt Right, 03=F/O Left, 04=F/O Right) PITOT heater (mast) light on with swit in.
	2. 30-31-00 Fig. 104 Block 2

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 31 04 __	1. (01=Capt Left, 02=Capt Right, 03=F/O Left, 04=F/O Right) PITOT heater (head) light on with switch in. 2. 30-31-00 Fig. 104 Block 2
30 31 05 __	1. (05=Left, 06=Right) ALPHA heater OFF light off with switch out. 2. 30-31-00 Fig. 105 Block 1
30 31 06 __	1. (05=Left, 06=Right) TEMP PROBES heater OFF light off with switch out. 2. 30-31-00 Fig. 105 Block 1
30 31 07 __	1. (01=Capt Left, 02=Capt Right, 03=F/O Left, 04=F/O Right) PITOT heater light off with switch out. 2. 30-31-00 Fig. 105 Block 1
30 41 01 __	1. (01=Capt, 02=F/O) WINDSHIELD HEAT FAULT light does not flash when TEST switch pressed. FAULT light off before TEST. 2. 30-41-00 Fig. 105 Block 1
30 41 02 00	1. Neither WINDSHIELD HEAT FAULT light comes on when TEST switch is pressed. Both FAULT lights off before TEST. 2. 30-41-00 Fig. 105 Block 1
30 41 03 __	1. (01=Capt, 02=F/O) WINDSHIELD HEAT FAULT light cycles on and off at approximately 3 minute cycles. 2. 30-41-00 Fig. 103 Block 8

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 41 04 __	1. (01=Capt, 02=F/O) WINDSHIELD HEAT FAULT light on. WINDSHIELD PWR circuit breaker 2B16 (capt) or 2B19 (F/O) does not remain in when cycled.
	2. 30-41-00 Fig. 103 Block 5
30 41 05 __	1. (01=Capt, 02=F/O) WINDSHIELD HEAT FAULT light on. With TEST switch pressed, FAULT light stay on steady. TEST switch pressed.
	2. 30-41-00 Fig. 103 Block 5
30 41 06 __	1. (01=Capt, 02=F/O) WINDSHIELD HEAT FAULT light on. WINDSHIELD HEAT FAULT light on. With TEST switch pressed, FAULT light flashes then goes off.
	2. 30-41-00 Fig. 103 Block 2
30 41 07 __	1. (01=Capt, 02=F/O) WINDSHIELD HEAT FAULT light on. With TEST switch pressed, FAULT light flashes.
	2. 30-41-00 Fig. 103 Block 2
30 41 08 __	1. All SIDE WINDOW heat switches in. (03=Left Rear, 04=Left Fwd, 05=Right Fwd, 06=Right Rear) FAULT light did not flash when TEST switch pressed, all other SIDE WINDOW heat FAULT lights flashing.
	2. 30-41-00 Fig. 105 Block 1
30 41 09 00	1. All SIDE WINDOW heat switches in. All FAULT lights remained off when TEST switch pressed.
	2. 30-41-00 Fig. 105 Block 1

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 41 10 __	1. (03=Left Rear, 04=Left Fwd, 05=Right Fwd, 06=Right Rear) SIDE WINDOW heat switch in, FAULT light on. Fault light remains on steady when TEST switch pressed. 2. 30-41-00 Fig. 104 Block 4
30 41 11 __	1. (03=Left Rear, 04=Left Fwd, 05=Right Fwd, 06=Right Rear) SIDE WINDOW heat switch in, FAULT light on. FAULT light flashes then goes off when TEST switch pressed. 2. 30-41-00 Fig. 104 Block 6
30 41 12 __	1. (03=Left Rear, 04=Left Fwd, 05=Right Fwd, 06=Right Rear) SIDE WINDOW heat switch in, FAULT light on. FAULT light flashes when TEST switch pressed. 2. 30-41-00 Fig. 104 Block 8
30 42 01 __	1. (01=Capt, 02=F/O) repellent switch in, cannister pressure in green band and REFILL not visible, (01=Capt, 02=F/O) INBD spray nozzle operate more than 1 second. 2. 30-42-00 Fig. 103 Block 5
30 42 02 __	1. (01=Capt, 02=F/O) repellent switch in, cannister pressure in green band and REFILL not visible, (01=Capt, 02=F/O) OUTBD spray nozzle operates more than 1 second. 2. 30-42-00 Fig. 103 Block 5
30 42 03 __	1. (01=Capt, 02=F/O) repellent switch in, cannister pressure in green band and REFILL not visible, (01=Capt, 02=F/O) INBD spray nozzle does not operate. 2. 30-42-00 Fig. 103 Block 2

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 42 04 __	1. (01=Capt, 02=F/O) repellent switch in, cannister pressure in green band and REFILL not visible, (01=Capt, 02=F/O) OUTBD spray nozzle does not operate. 2. 30-42-00 Fig. 103 Block 2
30 42 05 __	1. (01=Capt, 02=F/O) repellent switch in, cannister pressure in green band and REFILL not visible, (01=Capt, 02=F/O) both spray nozzles do not operate. 2. 30-42-00 Fig. 103 Block 2
30 42 06 __	1. (01=Capt, 02=F/O) repellent switch in, cannister pressure in red band and REFILL visible. 2. 30-42-00 Fig. 103 Block 3
30 43 01 __	1. Washer control switch in, pump light on (01=Capt, 02=F/O) control valve open. (01=Capt, 02=F/O) inbd spray nozzle inoperative. 2. 30-43-00 Fig. 103 Block 2
30 43 02 __	1. Washer control switch in, pump light on, (01=Capt, 02=F/O) control valve open. (01=Capt, 02=F/O) outbd spray nozzle inoperative. 2. 30-43-00 Fig. 103 Block 2
30 43 03 __	1. Washer control switch in, pump light on (01=Capt, 02=F/O) control valve open. (01=Capt, 02=F/O) both spray nozzles inoperative. 2. 30-43-00 Fig. 103 Block 1
30 43 04 __	1. Washer control switch in, pump light off. 2. 30-43-00 Fig. 103 Block 2

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 44 01 __	1. (01=Capt, 02=F/O) windshield wiper blade leaves streaks or voids on windshield.
	2. 30-44-00 Fig. 103 Block 13
30 44 02 __	1. (01=Capt, 02=F/O) windshield wiper does not park with switch in OFF position. Low/High operative.
	2. 30-44-00 Fig. 103 Block 6
30 44 03 __	1. (01=Capt, 02=F/O) windshield wiper inoperative with switch in Low position. High operative.
	2. 30-44-00 Fig. 103 Block 5
30 44 04 __	1. (01=Capt, 02=F/O) windshield wiper inoperative with switch in High position. Low operative.
	2. 30-44-00 Fig. 103 Block 5
30 44 05 __	1. (01=Capt, 02=F/O) windshield wiper inoperative in both HIGH and LOW switch positions.
	2. 30-44-00 Fig. 103 Block 5
30 51 01 00	1. VHF ANT ANTI-ICE light on with No. 2 and No. 3 PACK FLOW CONTROL and ENGINE ANTI-ICE 2 switches in. Both PACK FLOW CONTROL flowbars, No. 2 engine ANTI-ICE ON and HEAT lights on.
	2. 30-51-00 Fig. 103 Block 1
30 51 02 00	1. VHF ANT ANTI-ICE light on with No. 3 PACK FLOW CONTROL and ENGINE ANTI-ICE 2 switches in with PACK FLOW CONTROL flowbar, No. 2 ENGINE ANTI-ICE ON and HEAT lights on. No. 2 PACK FLOW CONT switch out.
	2. 30-51-00 Fig. 103 Block 4

FAULT CODE INDEX
TABLE 1 (CONTINUED)

	FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
	30 51 03 00	1. VHF ANT ANTI-ICE light on with No. 2 PACK FLOW CONTROL and ENGINE ANTI-ICE 2 switches in with PACK FLOW CONTROL flowbar, No. 2 ENGINE ANTI-ICE ON and HEAT lights on. No. 3 PACK FLOW CONTROL switch out. 2. 30-51-00 Fig. 103 Block 3
	30 51 04 00	1. VHF ANT ANTI-ICE light on with ENGINE ANTI-ICE 2 switch out. 2. 30-51-00 Fig. 103 Block 1
R R R	30 71 01 __	1. With (01=Mid, 02=Aft, 03=Both) DRAIN MAST HTR switchlight(s) unlatched, (01=Mid, 02=Aft, 03=Both) legend(s) came on. 2. 30-71-00 Fig. 104 Block 1
R R R	30 71 02 __	1. With (01=Mid, 02=Aft, 03=Both) DRAIN MAST HTR switchlight(s) latched, (01=Mid, 02=Aft, 03=Both) legend(s) come on. 2. 30-71-00 Fig. 104 Block 1
R R R	30 71 03 __	1. With (01=Mid, 02=Aft, 03=Both) DRAIN MAST HTR switchlight(s) latched or unlatched, both legends on. 2. 30-71-00 Fig. 104 Block 1
	30 71 04 00	1. NOT USED.
R R	30 71 05 00	1. Waterline heater annunciator stays on steady. 2. 30-71-00 Fig. 105 Block 1
	30 81 01 00	1. ICING light off when icing conditions exist. Light comes on with pilots LIGHT TEST. 2. 30-81-00 Fig. 103 Block 6

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
30 81 02 00	1. ICING light off when icing condition exist. Light stays off with pilots LIGHT TEST.
	2. 30-81-00 Fig. 103 Block 5
30 81 03 00	1. ICING light on when icing conditions do not exist.
	2. 30-81-00 Fig. 103 Block 6

ICE AND RAIN PROTECTION - DESCRIPTION AND OPERATION

1. General

The ice and rain protection system consists of the following subsystems:

Wing Anti-ice (Ref. 30-13-00)

The wing leading edge outboard slats (No. 4, 5, 6, and 7) are anti-iced by pressure- and temperature-regulated engine bleed air.

Engine Inlet Anti-ice (Ref. 30-21-00)

The engine air inlet cowl and the P1 probe on each engine are anti-iced by pressure- and temperature-regulated engine bleed air.

Windshield Temperature Control and Defogging (Ref. 30-41-00)

The two windshield panels in the flight station are electrically heated to prevent icing and maintain panel strength. The four side windows are heated to prevent fogging. The inside surface of the windshield panels is defogged by a fan and ducting system, using flight station air.

Windshield Rain Repellent (Ref. 30-42-00)

The windshield rain repellent system is an electrically controlled system that sprays a pressurized rain repellent solution on the two windshield panels.

Windshield Washer (Ref. 30-43-00)

The windshield washer system is electrically controlled and actuated to spray a cleaning fluid on the two windshield panels.

Windshield Wiper (Ref. 30-44-00)

The windshield wiper system is a two-speed electro/mechanical system that operates wiper blade assemblies on the two windshields.

R On aircraft 001-031 without SB30-043,
VHF Antenna Heat (Ref. 30-51-00)

The VHF No. 1 antenna is anti-iced by engine bleed air.

Water/Waste Heaters (Ref. 30-71-00)

The water/waste heaters are heating devices used to prevent freezing of water supply, drain, and waste lines and components.

R All components, lines, and fittings not in heated areas
R have provisions to prevent freezing whenever aircraft
R is powered and the relevant circuit breakers are
R closed. Aircraft parked for a prolonged time in
R subfreezing weather with no power applied should have
R the potable and waste water systems drained to prevent
R possible damage by ice formation. Instructions for
R draining potable water and waste water are contained in
R 39-11-00 and 12-15-11, respectively.

Ice Detector (Ref. 30-81-00)

The ice detector system detects icing conditions and provides indication in the flight station.

WING ANTI-ICE SYSTEM - DESCRIPTION AND OPERATION

1. General

The wing leading edge outboard slats (No. 4, 5, 6, and 7) are anti-iced by engine bleed air (Ref. Fig. 1). Anti-ice air (engine bleed air) is obtained from the pneumatic manifold inboard of each wing pylon. A regulating shutoff valve in each wing controls airflow. Downstream of the shutoff valve, a telescope duct connects the supply duct to the anti-ice (piccolo) ducts in the slat leading edges. The piccolo ducts are perforated and direct anti-ice air against the slat skin.

The left and right wing anti-ice systems are activated and monitored separately by switches and lights on the WING ANTI-ICE control panel located on the pilots overhead panel zone 210. Normally, the system is operated in the AUTO mode. The MANUAL mode is used only if the shutoff valve fails to open in the AUTO mode.

During automatic operation, a controller maintains slat skin
R temperature below 225 degrees F (107 degrees C). When this temperature is reached, the shutoff valve deenergizes and closes. The shutoff valve remains closed until temperature has
R decreased to 125 degrees F(51.7 degrees C) then reopens to repeat the cycle. An OVHT light on the control panel comes on
R if slat skin temperature reaches 250 degrees F(121 degrees C) A DUCT FAIL light comes on when the bleed air area overheat warning system (Ref. 36-22-00) senses an excessive temperature around the anti-ice supply ducts.

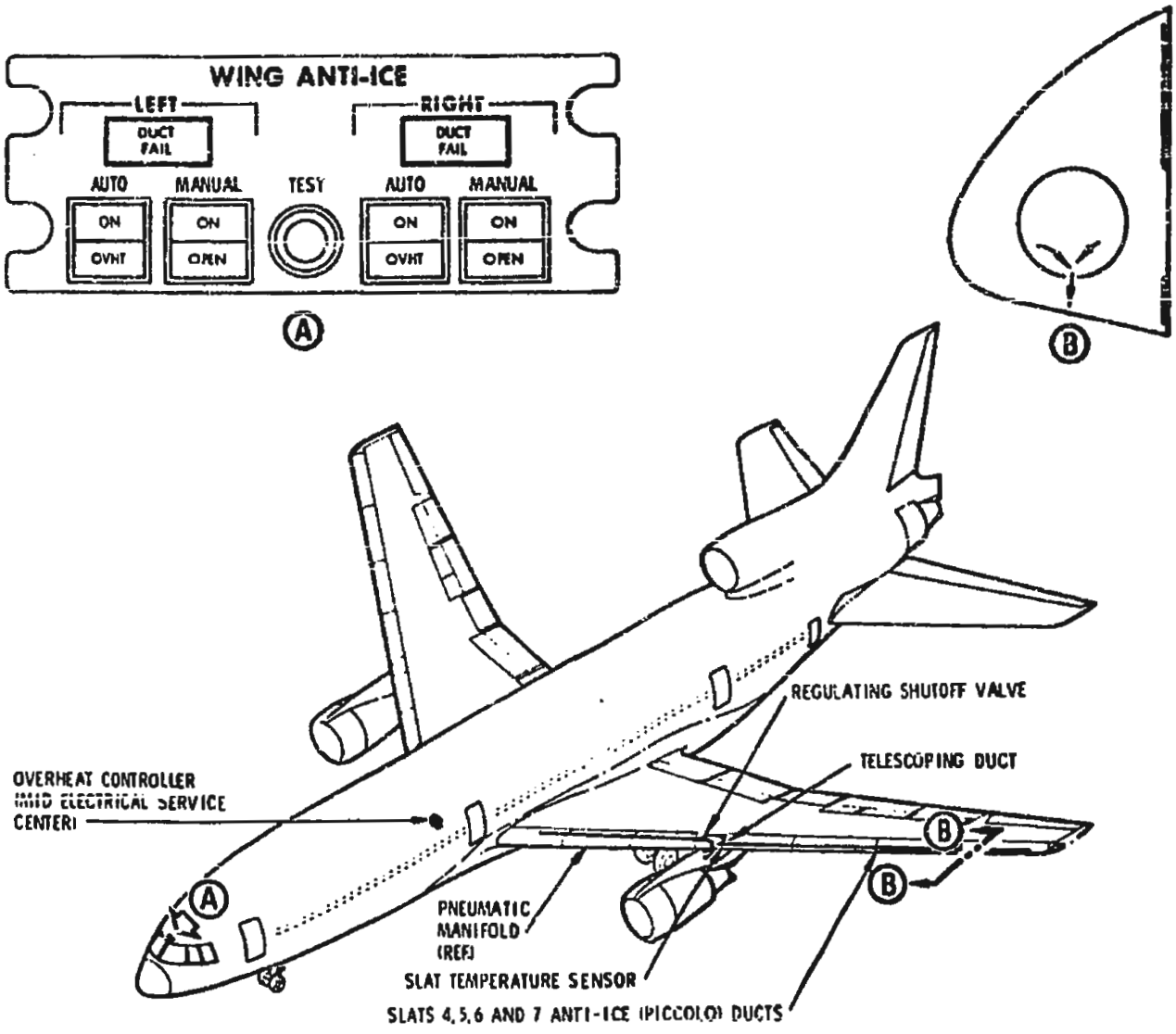
2. Operation

The system cannot be operated, except for testing, while the aircraft is on the ground. The left and right wing anti-ice systems are identical (only one system is described).

A. Normal Operation

(1) Automatic Mode

When the AUTO switchlight (Ref. Fig. 2) is depressed and latched, 28V dc is applied through the ground/air sensing relay (in air position) to the wing anti-ice controller to energize the bridge control circuit. At the same time, 28V dc is applied through a blocking diode to the engine bleed air control circuit (Ref. 36-11-00). This opens the high-pressure bleed air valve and mixing ejector to supply the necessary



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M1-0101-30-008

R Wing Anti-ice System
R Figure 1

EFFECTIVITY: ALL

high-temperature air to the shutoff valve. The shutoff valve opens, and the OPEN legend of the MANUAL switchlight comes on.

The skin temperature sensor in the wing slat is a dual thermistor sensor unit. One thermistor controls the shutoff valve, and the other controls the OVHT light. When the temperature of the slat skin reaches 225 degrees F (107 degrees C), the sensor low resistance unbalances the controller bridge. The amplifier energizes the control relay which removes power from the shutoff valve. The shutoff valve closes and allows the slat skin to cool. The relay also shorts out a portion of the bridge circuit to set the dropout temperature at 125 degrees F (51.7 degrees C). Thus, the slat temperature will cycle between 125 and 225 degrees F (51.7 and 107 degrees C).

R A pressure operated position switch on the anti-ice
R shutoff valve assembly, operates at 4 to 10 psi and
R supplies 28V dc to turn on the MANUAL switch OPEN light
R legend, whenever the anti-ice valve is open.

(2) Manual Mode

The manual mode of operation overrides the automatic mode. When the MANUAL switchlight is depressed and latched, 28V dc is applied through the ground/air sensing relay (in air position) to the shutoff valve. The shutoff valve opens, and the OPEN legend of the MANUAL switchlight comes on.

(3) Test Mode

The test mode permits checking the system when the aircraft is on the ground. When either the AUTO or MANUAL switchlight is depressed and latched, and the TEST switch is depressed, 28V dc bypasses the ground/air sensing relay to open the shutoff valve. When the shutoff valve opens, the OPEN legend of the MANUAL switchlight comes on. When the TEST switch is released, the shutoff valve closes and the OPEN legend goes out.

B. Malfunction

(1) OVHT Light

If the slat skin temperature exceeds 250 degrees F (121 degrees C), the overheat sensor turns on the OVHT legend of the AUTO switchlight. When the temperature

drops to 150 degrees F (65.6 degrees C), the OVHT legend goes out.

(2) DUCT FAIL Light

A duct leak in the wing fixed leading edge area will be detected when hot air is sensed by bleed air area overheat sensors (Ref. 36-22-00). The sensors, through the bleed air area overheat system controller, turn on the DUCT FAIL light.

3. Controller

A. Description and Operation

The wing anti-ice controller is a dual channel unit which controls the automatic operation of the regulating shutoff valves. One channel monitors the left wing system and the other monitors the right wing system. The controller is installed in the mid electrical service center, zone 137.

The controller operates on signals from one element of the slat skin temperature sensors to cycle the regulating shutoff valves on and off. Signals from the other element of the sensors are used to energize the OVHT lights on the WING ANTI-ICE control panel.

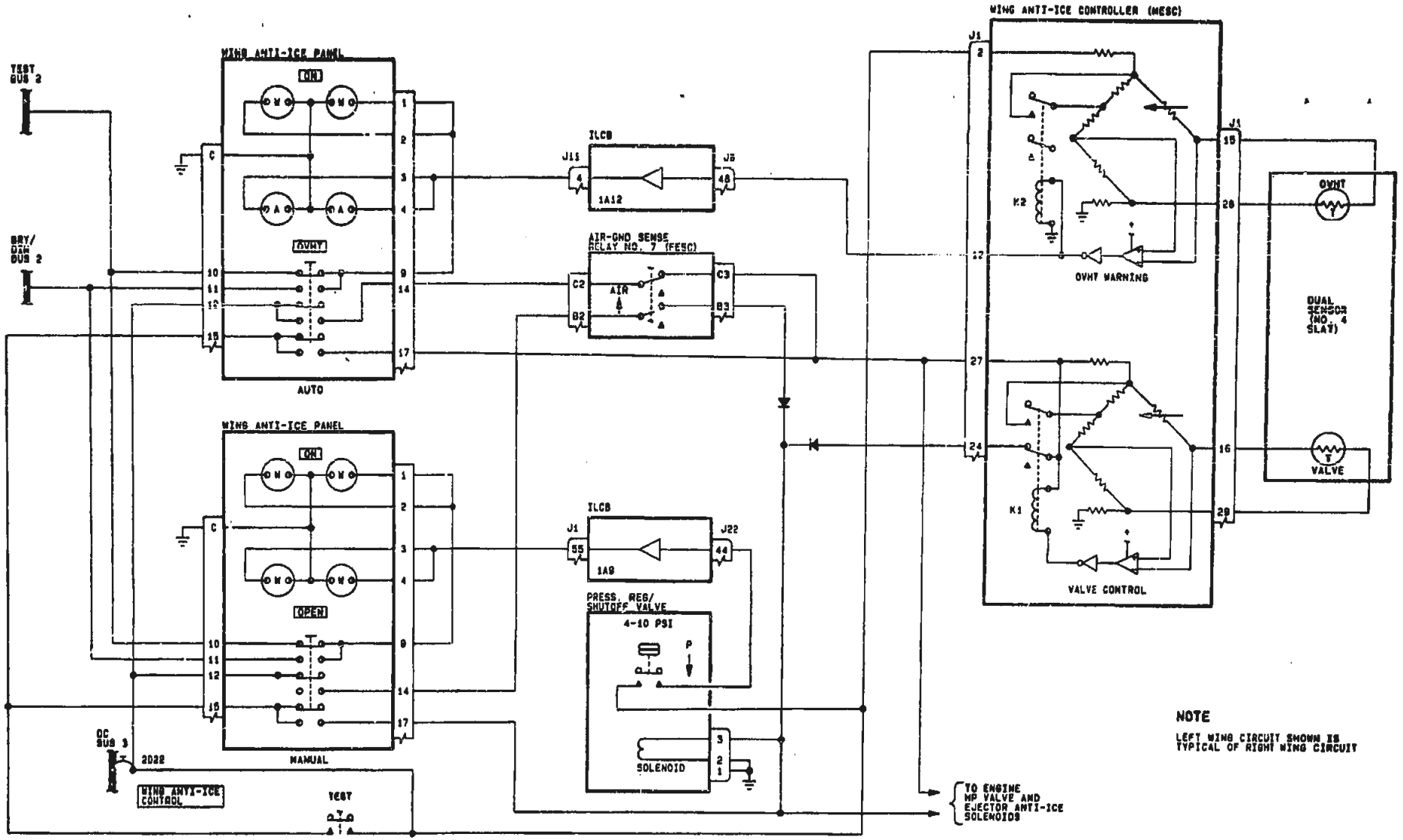
4. Regulating Shutoff Valve

A. Description and Operation

The regulating shutoff valve (Ref. Fig. 3) is a solenoid-controlled, pneumatically operated sleeve valve. The shutoff valve comprises a valve body and externally mounted control pressure regulator, solenoid valve, and pressure switch. The valve body incorporates a normally closed spring-loaded sleeve.

Upstream pressure enters the control pressure regulator; from there it is ported to the downstream (valve opening) side of the valve sleeve. With the solenoid deenergized, upstream pressure is also present on the upstream (valve closing) side of the sleeve. The valve is thus held closed by spring pressure.

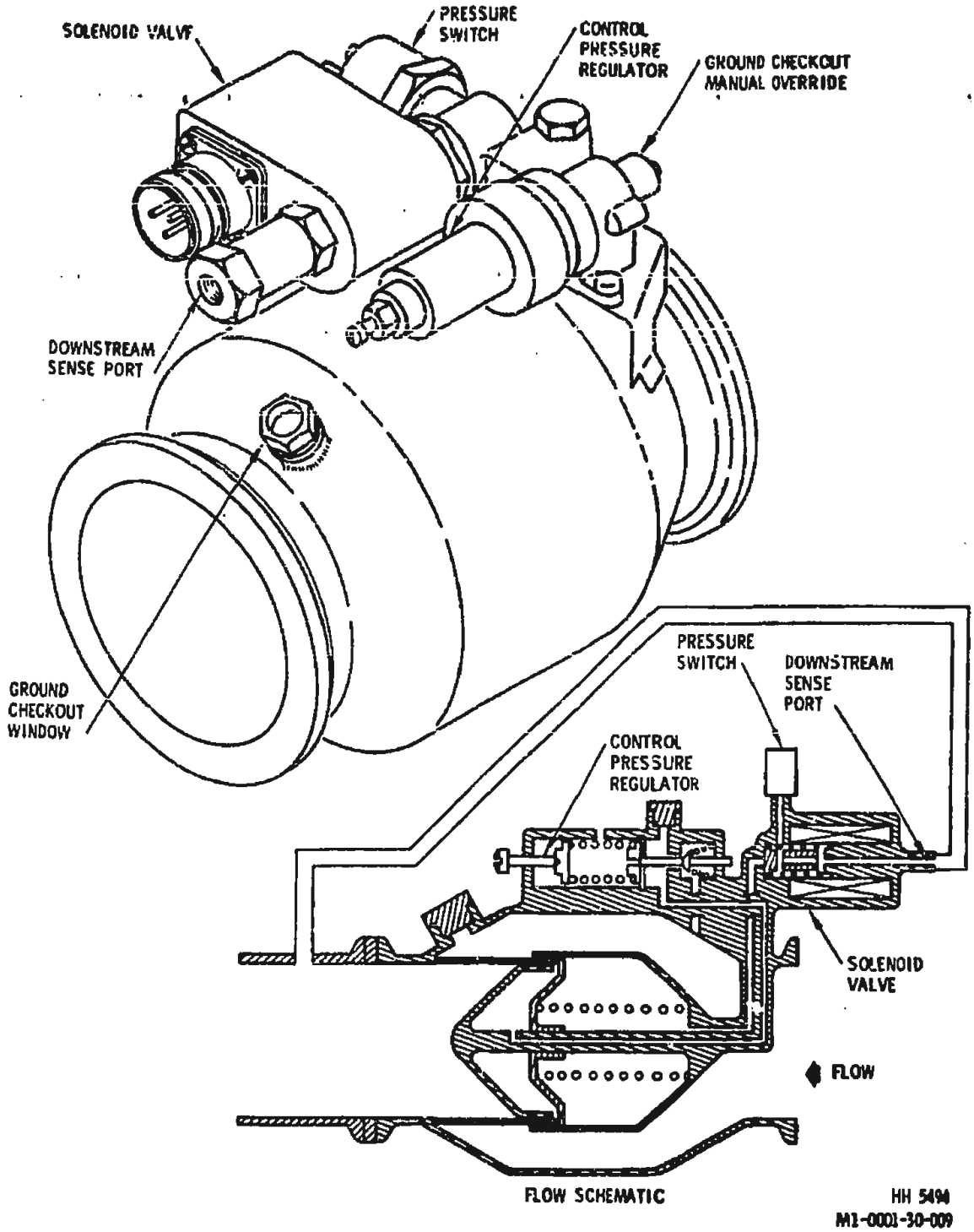
When the solenoid is energized, upstream pressure is released from, and downstream pressure is ported to, the upstream side of the sleeve. The resulting pressure differential between the upstream and downstream sides of the sleeve moves it to the open position. Valve outlet



R Wing Anti-ice System Schematic
R Figure 2

EFFECTIVITY: ALL

001B



Wing Anti-ice Regulating Shutoff Valve
Figure 3

pressure is held constant by regulating the control pressure to the valve opening chamber. This is accomplished by the control pressure regulator which discharges a variable amount of control pressure to atmosphere and thus varies the opening chamber pressure.

5. Slat Dual Temperature Sensor

A. Description and Operation

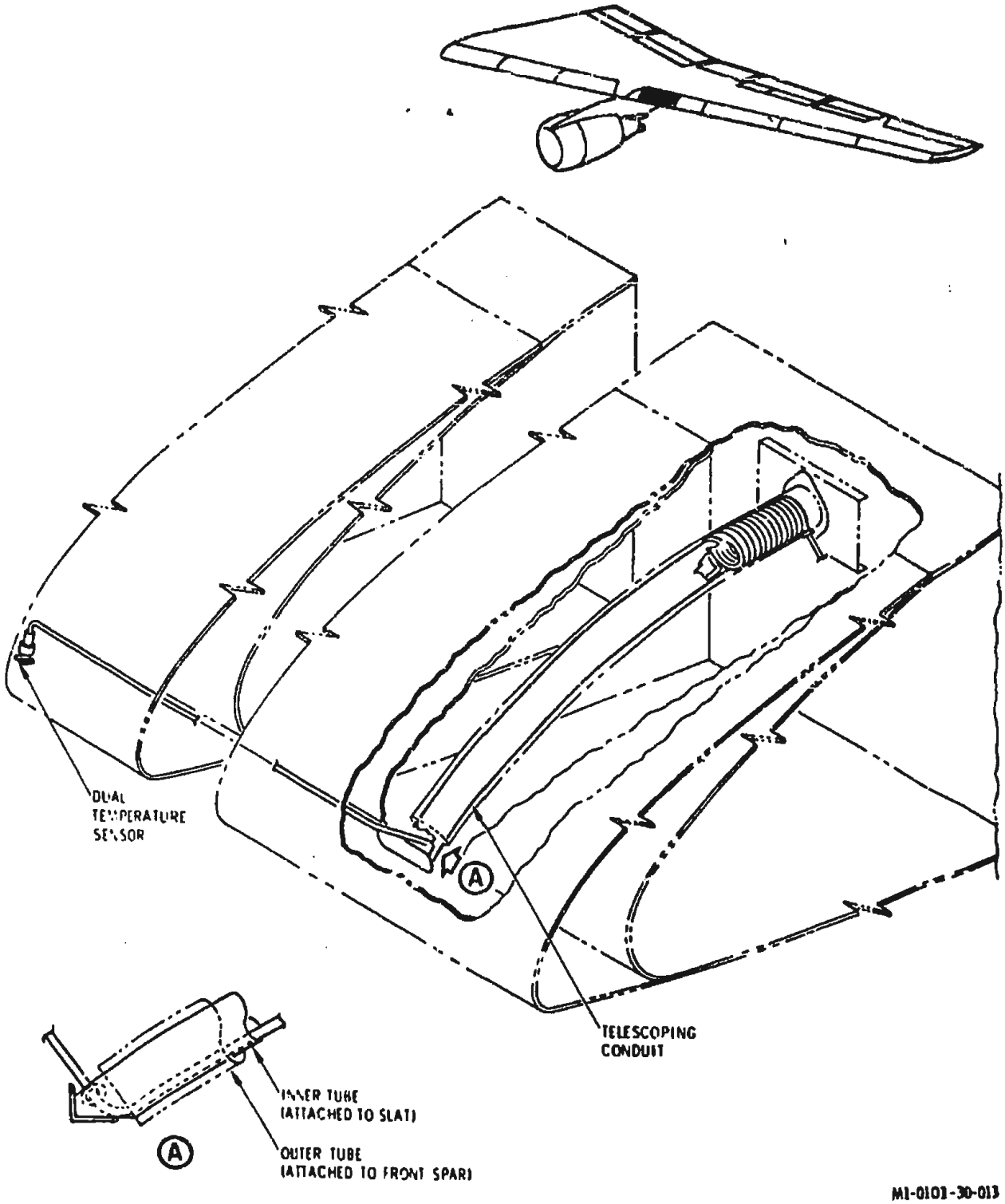
The slat dual temperature sensor (Ref. Fig. 4) is installed in the first outboard (No. 4) slat immediately inboard of the telescope duct. A telescoping conduit is provided to carry the electrical lead to the wing fixed leading edge. The sensor incorporates two thermistor elements which provide slat skin temperature signals to the overheat controller. One element controls the anti-ice valve; the second element operates the OVHT light circuit.

R NOTE: Temperature sensing circuit is of a negative
R coefficient design and will not detect an open
R sensor/wire fault.

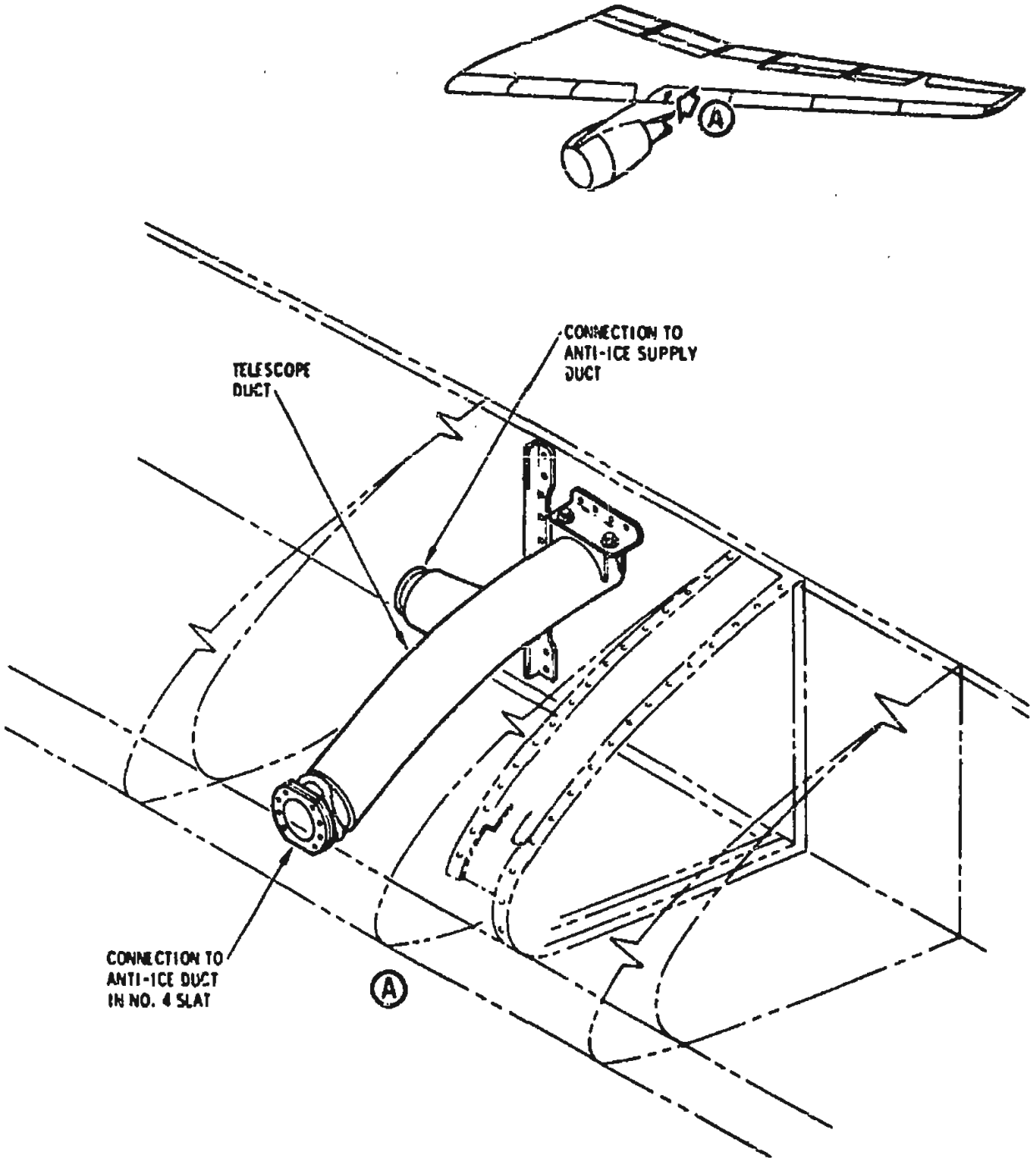
6. Anti-ice Ducts

A. Description

Anti-ice air from the regulating shutoff valve flows through supply ducts to the telescope duct (Ref. Fig. 5). The inner tube of the telescope duct is connected to the piccolo duct in the first outboard (No. 4) slat and moves with the slat as it extends and retracts. The four piccolo ducts (Ref. Fig. 6) have holes which direct air against the inside of the slat skin. Flexible bellows-type connectors (Ref. Fig. 7) are used to connect the piccolo ducts between slats.



Slat Dual Temperature Sensor
Figure 4



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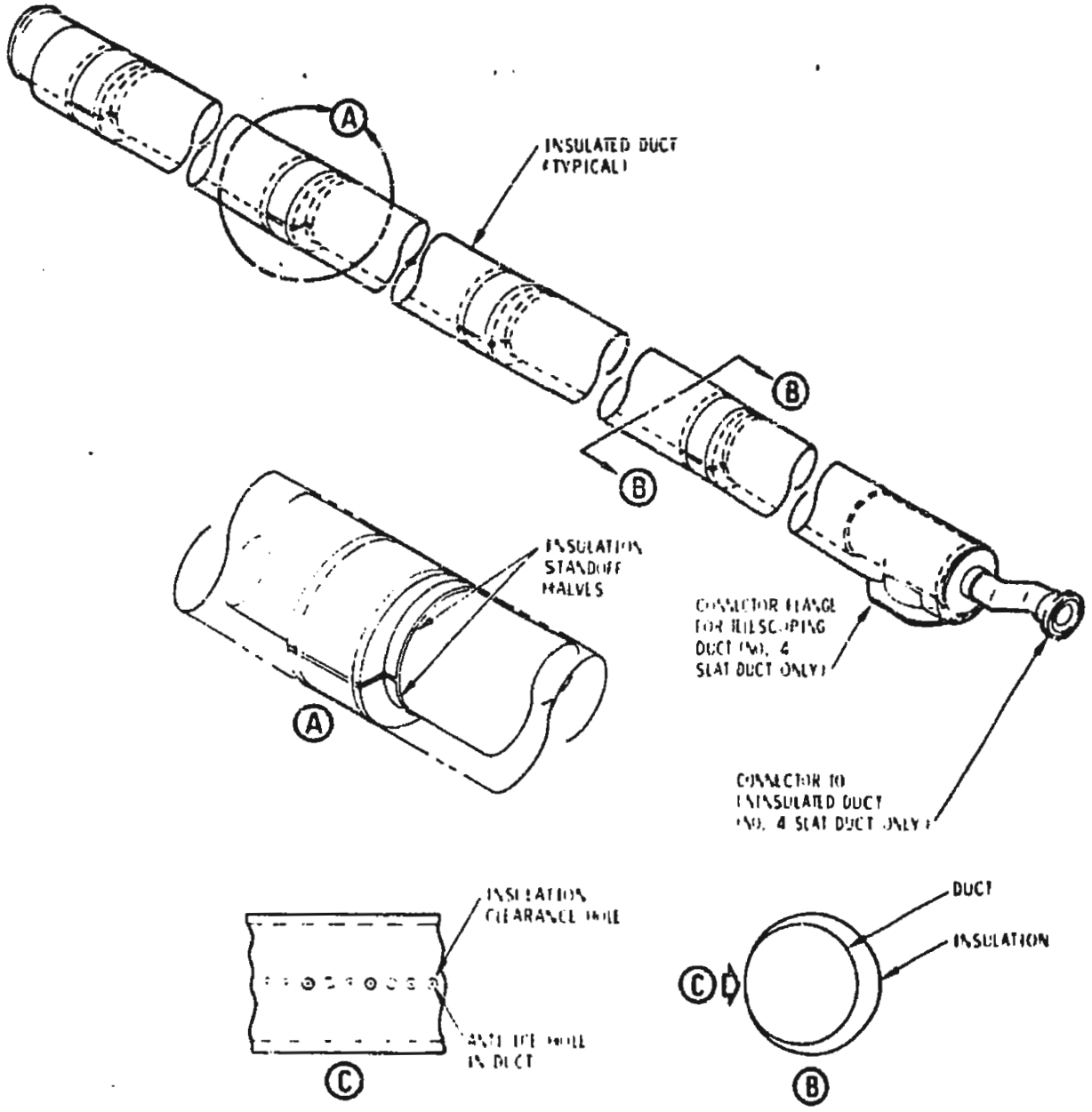
Wing Anti-ice Telescope Duct
Figure 5



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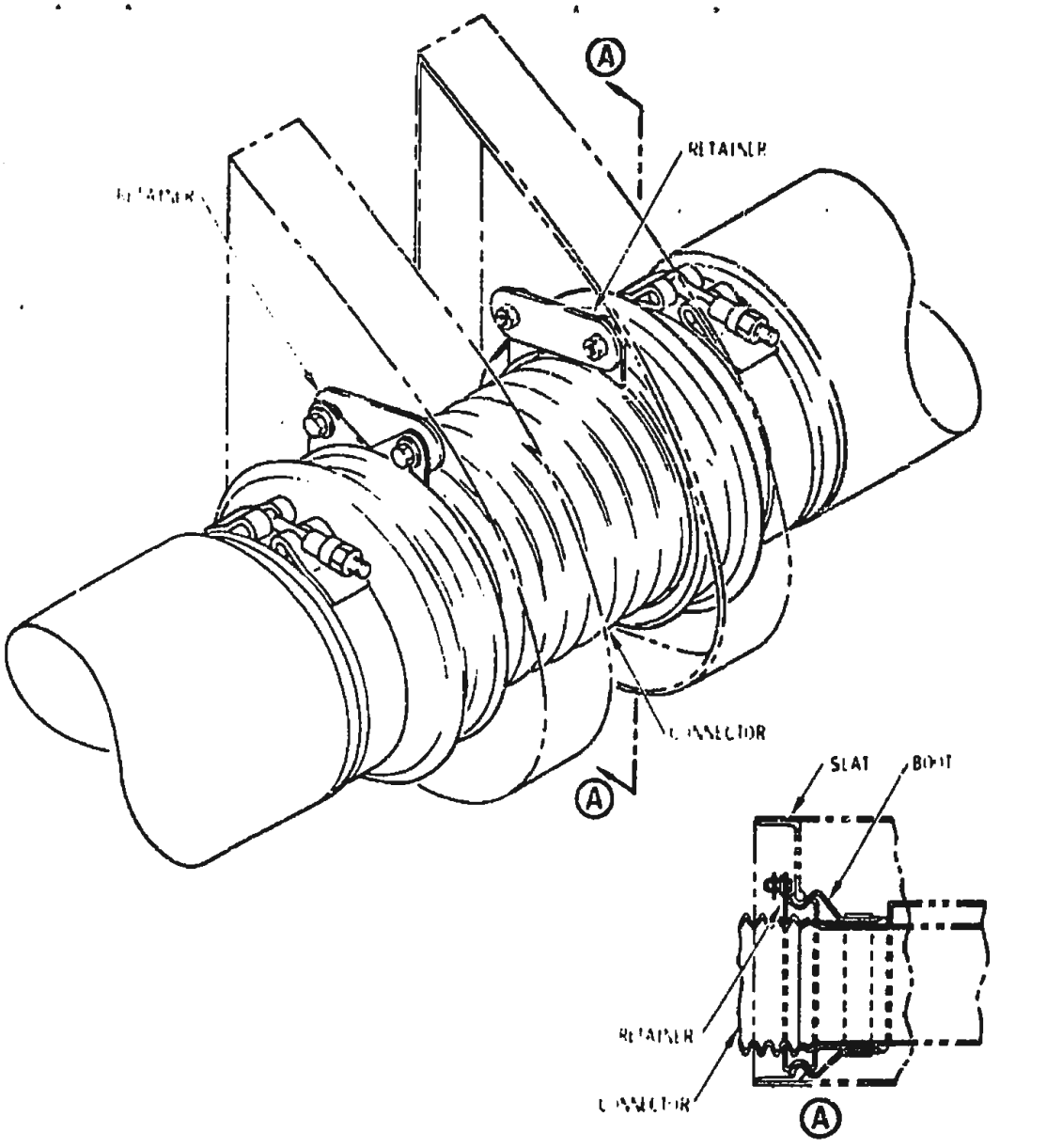
SU-AOG 30-011

Wing Anti-ice (Piccolo) Ducts
Figure 6



Wing Anti-ice Duct Connector
Figure 7

R

WING ANTI-ICE SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for troubleshooting Wing Anti-ice system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 30 Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the entry point containing the fault isolation procedure. When no block number is specified, the entry point is block 1.

R PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnect wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Wing Anti-ice system. It gives the access/area of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 is a list of fault isolation data in this section of the manual.

Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Wing Anti-ice Problem
SCHEM 1	Wing Anti-ice System Schematic

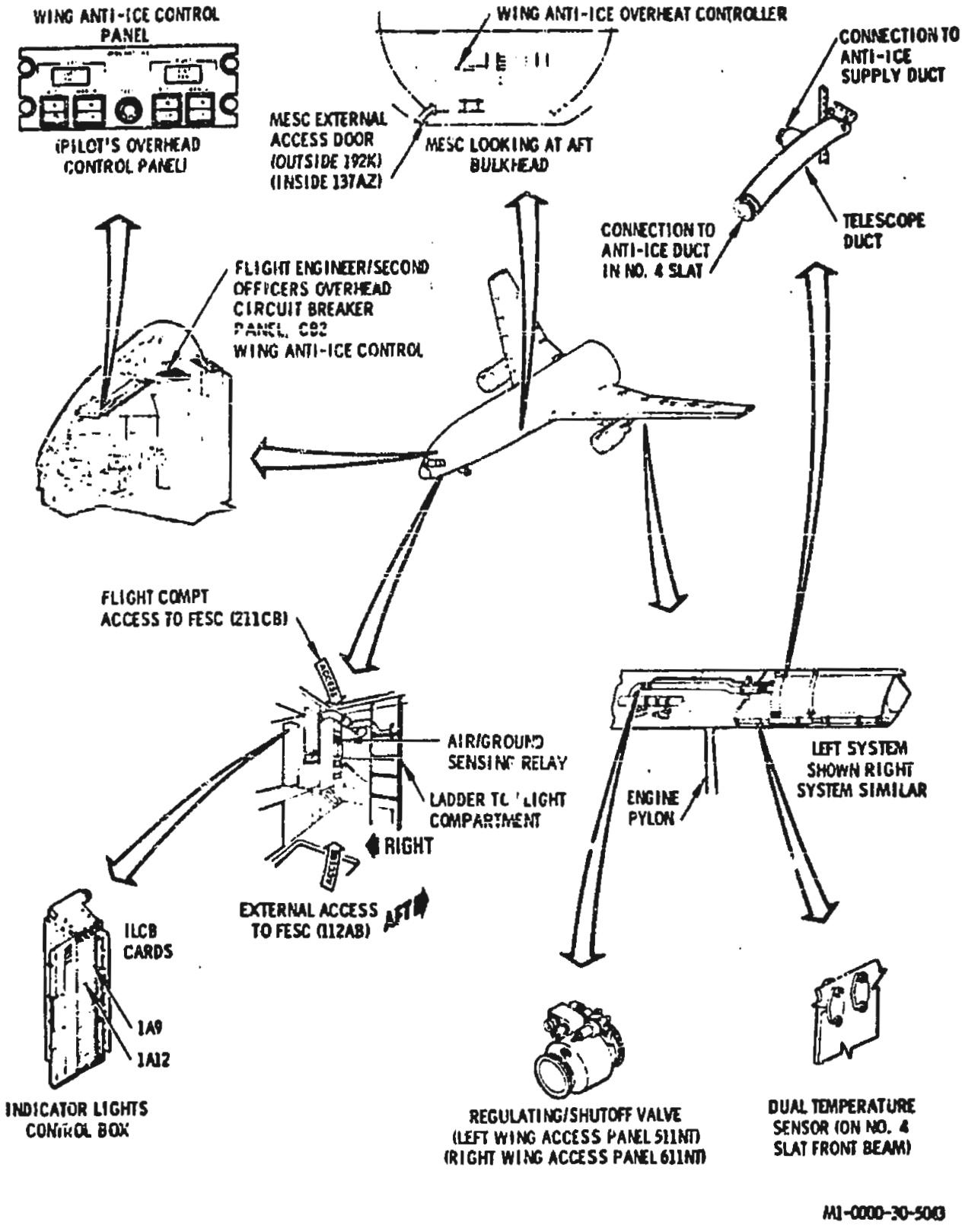
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKER:			
WING ANTI-ICE CONTROL (3013-CB1)	1	FE/SO OVHD CB2 PNL/P10	*
CONTROL BOX - INDICATOR LIGHTS (ILCB):			
CARD 1A9	1	FESC/112AB	33-17-04
CARD 1A12	1	FESC/112AB	33-17-04
CONTROL PANEL - WING ANTI-ICE	1	PILOT OVHD PNL/P5	30-13-99
CONTROLLER - OVERHEAT (3622-A1)	1	MESC/192K	30-13-01
DUCT - TELESCOPING, AIR SUPPLY	2	NO. 4 SLAT - LH/RH	30-13-06
INDICATOR LIGHT - DUCT FAILURE (3013-DS5)	2	WING ANTI-ICE CONTROL PNL/P5	30-13-39
RELAY - AIR/GROUND SENSING (3263-K2) (3263-K3)	2	FESC/112AB	32-63-00
SENSOR - DUAL TEMPERATURE, LEFT (3013-RT1)	1	NO. 4 SLAT, RH LOWER SKIN	30-13-04
SENSOR - DUAL TEMPERATURE, RIGHT (3013-RT2)	1	NO. 4 SLAT, RH LOWER SKIN	30-13-05
SWITCH - SYSTEM TEST (3013-S1)	1	WING ANTI-ICE CONTROL PNL/P5	30-13-29
SWITCHLIGHTS:			
LEFT AUTO (3013-DS1)	1	WING ANTI-ICE CONTROL PNL/P5	20-33-01
RIGHT AUTO (3013-DS2)	1	WING ANTI-ICE CONTROL PNL/P5	20-33-01
LEFT MANUAL (3013-DS3)	1	WING ANTI-ICE CONTROL PNL/P5	20-33-01
RIGHT MANUAL (3013-DS4)	1	WING ANTI-ICE CONTROL PNL/P5	20-33-01
VALVE - REGULATOR/SHUTOFF, LEFT (3013-A3)	1	LEADING EDGE/511NT	30-13-02
VALVE - REGULATOR/SHUTOFF, RIGHT (3013-A2)	1	LEADING EDGE/611NT	30-13-03

*SEE WM EQUIPMENT LIST

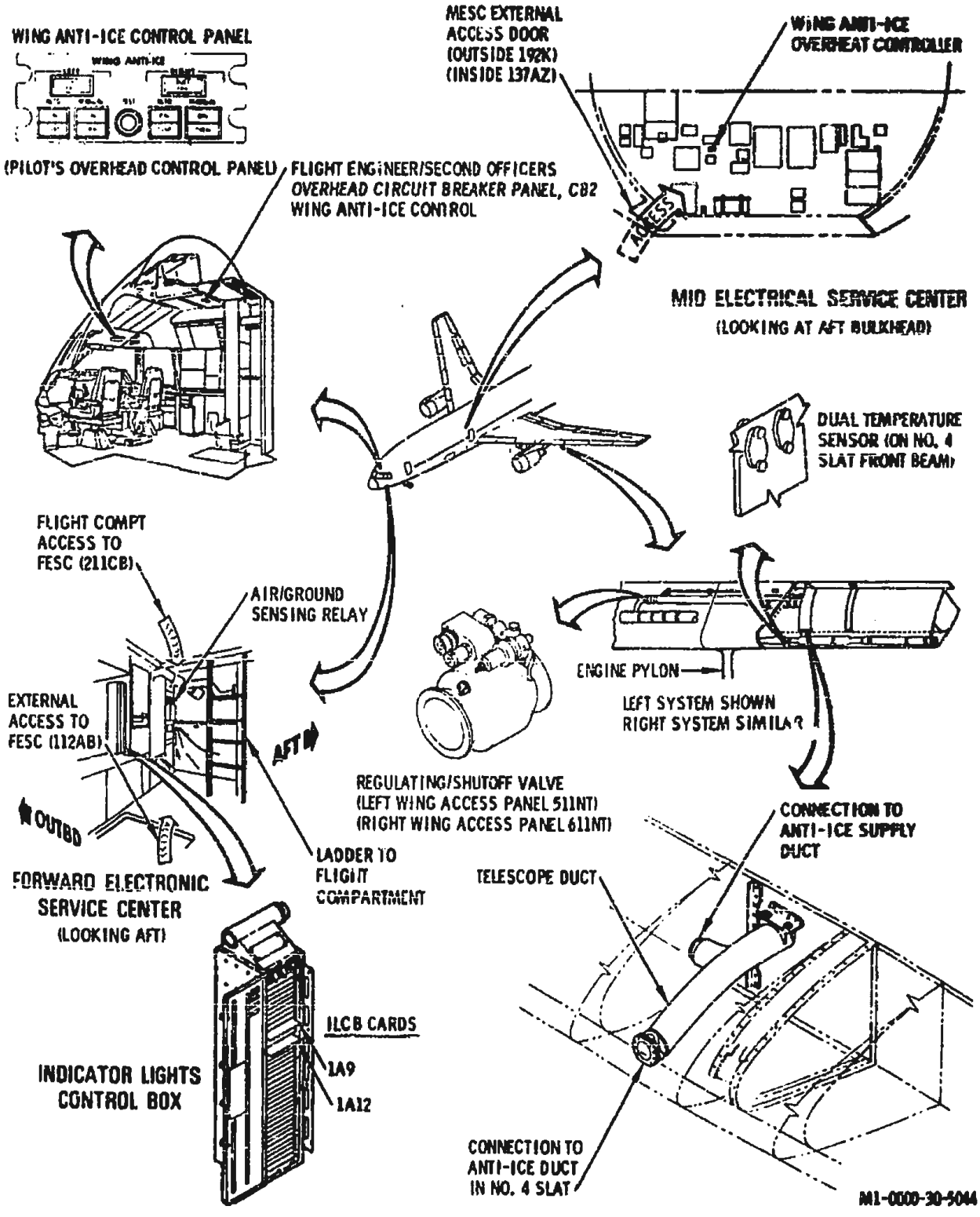
M1-0000-30-5045

R R Component Location Index
Figure 101

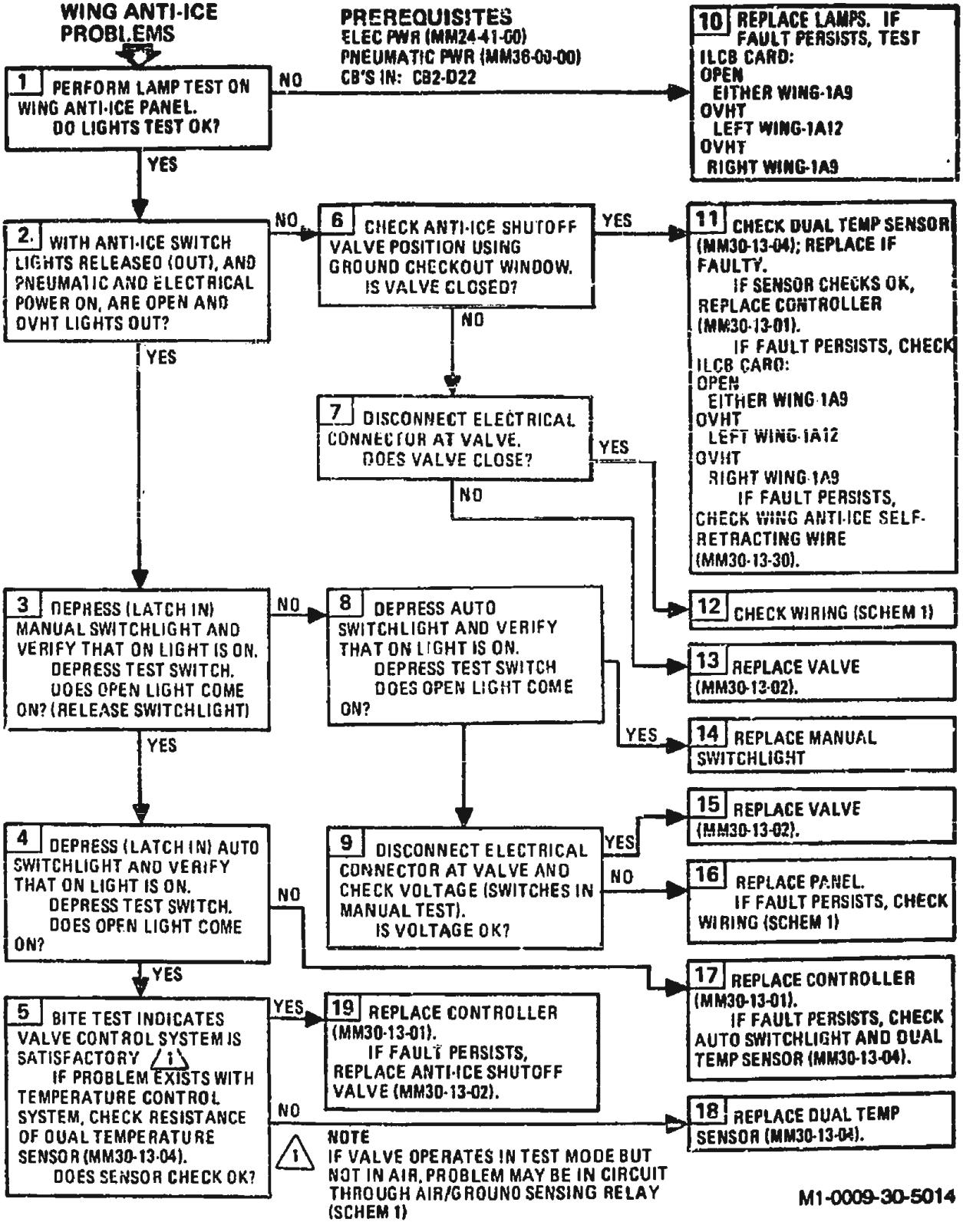
R EFFECTIVITY: ALL
R R
0018


WING ANTI-ICE CONTROL PANEL
(PILOT'S OVERHEAD CONTROL PANEL)
WING ANTI-ICE OVERHEAT CONTROLLER
MESC EXTERNAL ACCESS DOOR (OUTSIDE 192K) (INSIDE 137AZ)
MESC LOOKING AT AFT BULKHEAD
CONNECTION TO ANTI-ICE SUPPLY DUCT
TELESCOPE DUCT
CONNECTION TO ANTI-ICE DUCT IN NO. 4 SLAT
FLIGHT ENGINEER/SECOND OFFICERS OVERHEAD CIRCUIT BREAKER PANEL C82 WING ANTI-ICE CONTROL
FLIGHT COMPT ACCESS TO FESC (211CB)
AIR/GROUND SENSING RELAY
LADDER TO FLIGHT COMPARTMENT
RIGHT
EXTERNAL ACCESS TO FESC (112AB)
AFT
ILCB CARDS
1A9
1A12
INDICATOR LIGHTS CONTROL BOX
ENGINE PYLON
LEFT SYSTEM SHOWN RIGHT SYSTEM SIMILAR
REGULATING/SHUTOFF VALVE (LEFT WING ACCESS PANEL 511NT) (RIGHT WING ACCESS PANEL 611NT)
DUAL TEMPERATURE SENSOR (ON NO. 4 SLAT FRONT BEAM)
M1-0000-30-5003

Component Locator Diagram
Figure 102

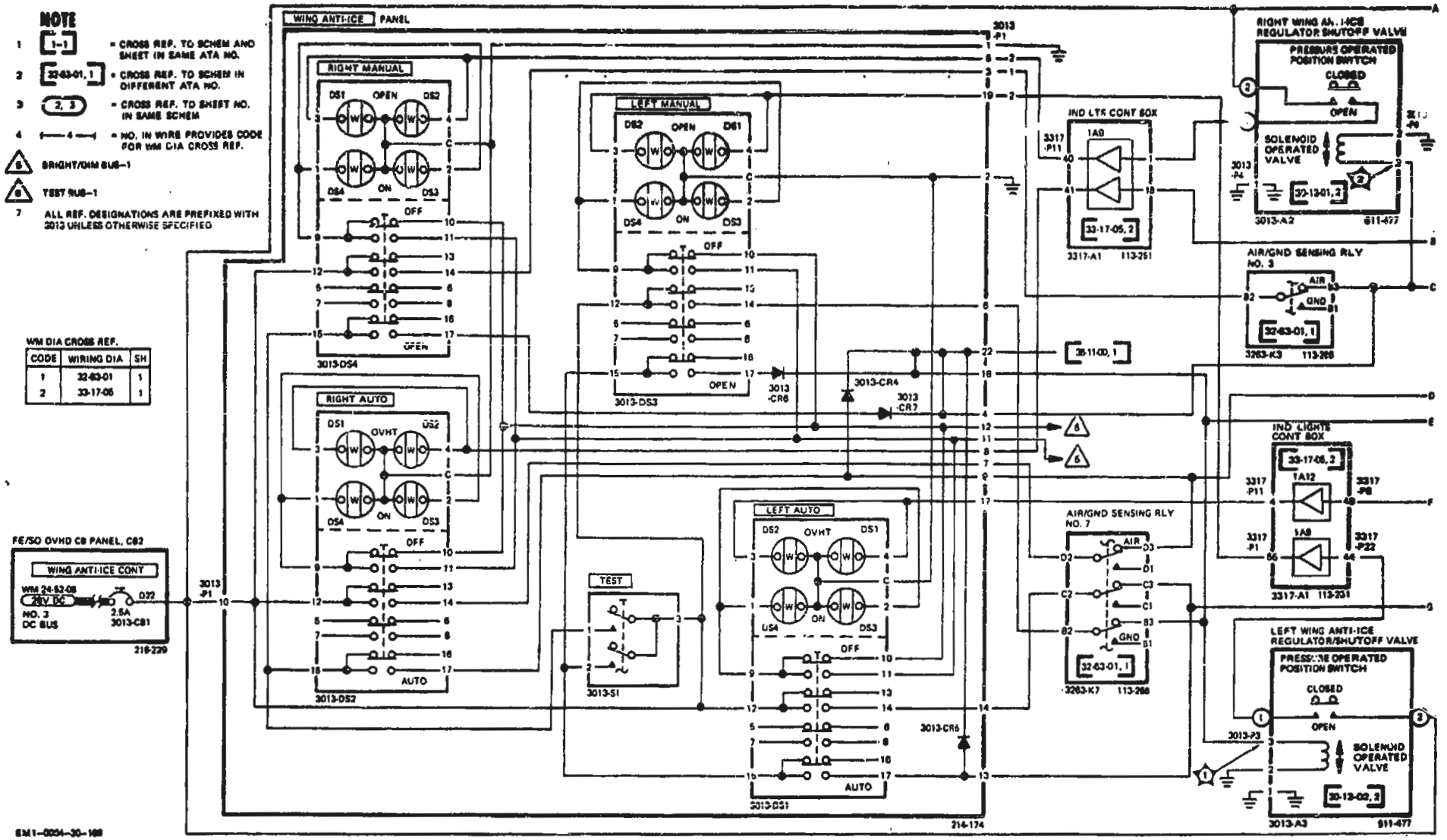

WING ANTI-ICE CONTROL PANEL
(PILOT'S OVERHEAD CONTROL PANEL)
FLIGHT ENGINEER/SECOND OFFICERS OVERHEAD CIRCUIT BREAKER PANEL, CB2 WING ANTI-ICE CONTROL
MESC EXTERNAL ACCESS DOOR (OUTSIDE 192K) (INSIDE 137AZ)
WING ANTI-ICE OVERHEAT CONTROLLER
ACCESS
MID ELECTRICAL SERVICE CENTER
(LOOKING AT AFT BULKHEAD)
DUAL TEMPERATURE SENSOR (ON NO. 4 SLAT FRONT BEAM)
FLIGHT COMPT ACCESS TO FESC (211CB)
AIR/GROUND SENSING RELAY
EXTERNAL ACCESS TO FESC (112AB)
AFT
OUTBD
FORWARD ELECTRONIC SERVICE CENTER
(LOOKING AFT)
LADDER TO FLIGHT COMPARTMENT
ENGINE PYLON
LEFT SYSTEM SHOWN RIGHT SYSTEM SIMILAR
REGULATING/SHUTOFF VALVE
(LEFT WING ACCESS PANEL 511NT)
(RIGHT WING ACCESS PANEL 611NT)
CONNECTION TO ANTI-ICE SUPPLY DUCT
TELESCOPE DUCT
ILCB CARDS
1A9
1A12
INDICATOR LIGHTS CONTROL BOX
CONNECTION TO ANTI-ICE DUCT IN NO. 4 SLAT
M1-0000-30-5044

R
R Component Locator Diagram
Figure 102


WING ANTI-ICE PROBLEMS
PREREQUISITES
ELEC PWR (MM24-41-00)
PNEUMATIC PWR (MM36-00-00)
CB'S IN: CB2-D22
1 PERFORM LAMP TEST ON WING ANTI-ICE PANEL. DO LIGHTS TEST OK?
NO
YES
10 REPLACE LAMPS. IF FAULT PERSISTS, TEST ILCB CARD:
OPEN
EITHER WING-1A9
OVHT
LEFT WING-1A12
OVHT
RIGHT WING-1A9
2. WITH ANTI-ICE SWITCH LIGHTS RELEASED (OUT), AND PNEUMATIC AND ELECTRICAL POWER ON, ARE OPEN AND OVHT LIGHTS OUT?
NO
YES
6 CHECK ANTI-ICE SHUTOFF VALVE POSITION USING GROUND CHECKOUT WINDOW. IS VALVE CLOSED?
YES
NO
11 CHECK DUAL TEMP SENSOR (MM30-13-04); REPLACE IF FAULTY.
IF SENSOR CHECKS OK, REPLACE CONTROLLER (MM30-13-01).
IF FAULT PERSISTS, CHECK ILCB CARD:
OPEN
EITHER WING-1A9
OVHT
LEFT WING-1A12
OVHT
RIGHT WING-1A9
IF FAULT PERSISTS, CHECK WING ANTI-ICE SELF-RETRACTING WIRE (MM30-13-30).
7 DISCONNECT ELECTRICAL CONNECTOR AT VALVE. DOES VALVE CLOSE?
YES
NO
12 CHECK WIRING (SCHEM 1)
3 DEPRESS (LATCH IN) MANUAL SWITCHLIGHT AND VERIFY THAT ON LIGHT IS ON. DEPRESS TEST SWITCH. DOES OPEN LIGHT COME ON? (RELEASE SWITCHLIGHT)
NO
YES
8 DEPRESS AUTO SWITCHLIGHT AND VERIFY THAT ON LIGHT IS ON. DEPRESS TEST SWITCH DOES OPEN LIGHT COME ON?
13 REPLACE VALVE (MM30-13-02).
YES
14 REPLACE MANUAL SWITCHLIGHT
4 DEPRESS (LATCH IN) AUTO SWITCHLIGHT AND VERIFY THAT ON LIGHT IS ON. DEPRESS TEST SWITCH. DOES OPEN LIGHT COME ON?
NO
YES
9 DISCONNECT ELECTRICAL CONNECTOR AT VALVE AND CHECK VOLTAGE (SWITCHES IN MANUAL TEST). IS VOLTAGE OK?
YES
NO
15 REPLACE VALVE (MM30-13-02).
16 REPLACE PANEL. IF FAULT PERSISTS, CHECK WIRING (SCHEM 1)
17 REPLACE CONTROLLER (MM30-13-01). IF FAULT PERSISTS, CHECK AUTO SWITCHLIGHT AND DUAL TEMP SENSOR (MM30-13-04).
5 BITE TEST INDICATES VALVE CONTROL SYSTEM IS SATISFACTORY (1) IF PROBLEM EXISTS WITH TEMPERATURE CONTROL SYSTEM, CHECK RESISTANCE OF DUAL TEMPERATURE SENSOR (MM30-13-04). DOES SENSOR CHECK OK?
YES
NO
19 REPLACE CONTROLLER (MM30-13-01). IF FAULT PERSISTS, REPLACE ANTI-ICE SHUTOFF VALVE (MM30-13-02).
18 REPLACE DUAL TEMP SENSOR (MM30-13-04).
(1) NOTE
IF VALVE OPERATES IN TEST MODE BUT NOT IN AIR, PROBLEM MAY BE IN CIRCUIT THROUGH AIR/GROUND SENSING RELAY (SCHEM 1)
M1-0009-30-5014

R
R

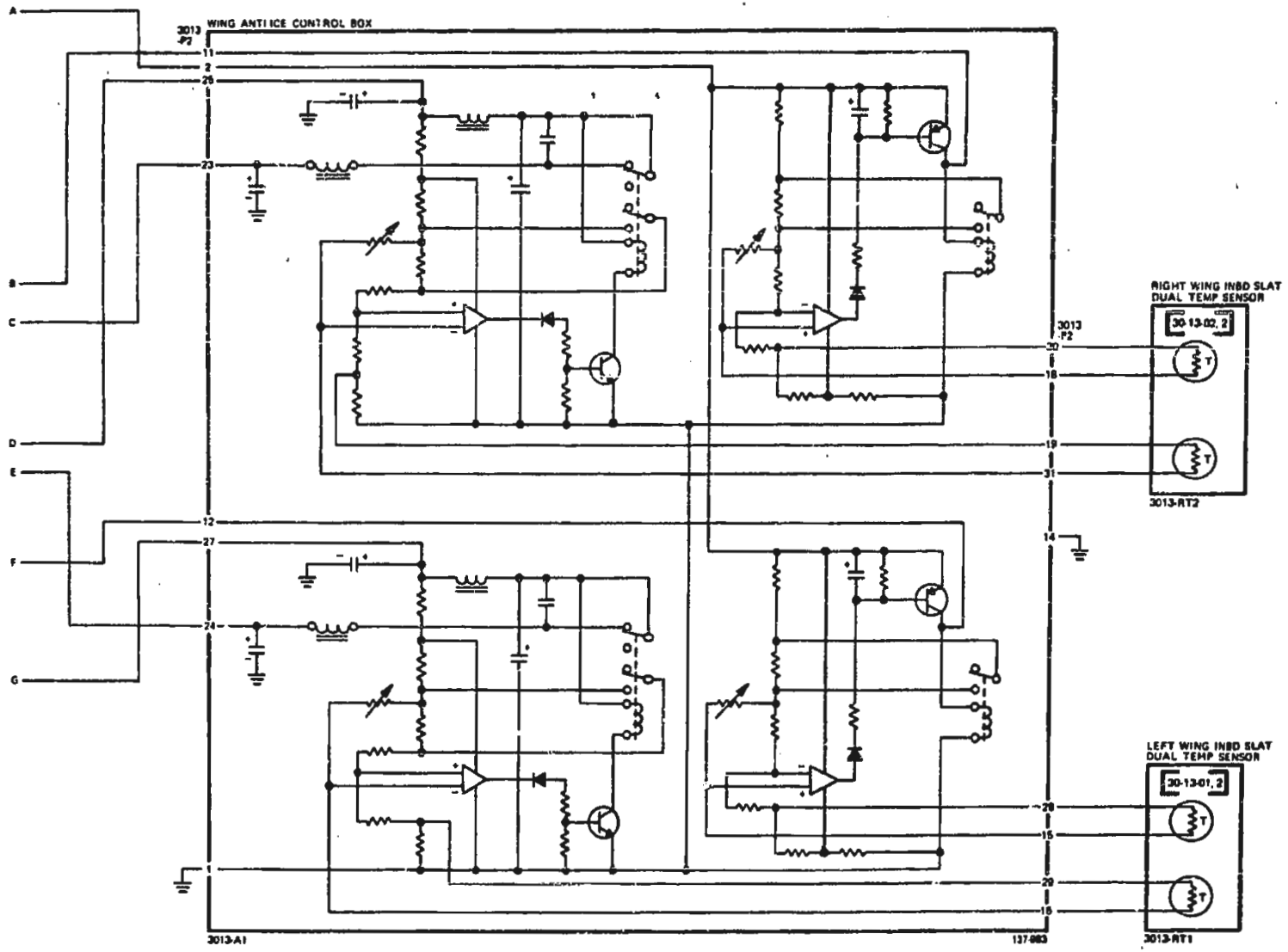
Wing Anti-ice Problem
Figure 103



R Wing Anti-ice System Schematic
R SCHEM 1 (Sheet 1)

EFFECTIVITY: ALL

001B



R Wing Anti-ice System Schematic
R SCHEM 1 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

R WING ANTI-ICE SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

24-41-00 External Power/Ground Service System - Maintenance Practices

36-13-00 High-Pressure Ground Air System - Maintenance Practices

R 2. Adjustment/Test

R A. BITE Test

(1) Prepare for test as follows:

(a) Energize electrical system (Ref. 24-41-00).

(b) Pressurize pneumatic manifold (Ref. 36-13-00).

(c) On Flight Engineer/Second Officers overhead circuit breaker panel CB-2, zone 215, verify that following circuit breakers are closed:

WING ANTI-ICE CONT (D22)

PILOTS IND LT TEST (H8-10)

MLG GND SENSE (L8)

(2) Verify that all wing anti-ice panel lamps test OK by actuating LIGHTS test switch.

(3) On WING ANTI-ICE panel, depress and release both MANUAL switchlights to energize left and right manual systems. Both MANUAL switchlights must indicate ON.

(4) Actuate and hold TEST switch. Both MANUAL switchlights must indicate OPEN.

(5) Release TEST switch. Both OPEN lights go off.

(6) Depress and release both MANUAL switchlights to deenergize both manual systems. Both ON lights go off.

(7) Depress and release both AUTO switchlights to energize left and right automatic systems. Both AUTO switchlights must indicate ON.

(8) Actuate and hold TEST switch. Both MANUAL switchlights must indicate OPEN.

(9) Release TEST switch. Both OPEN lights go off.

(10) Depress and release both AUTO switchlights to deenergize both automatic systems.

(11) Shut down pneumatic power source.

(12) Deenergize electrical system (Ref. 24-41-00).

OVERHEAT CONTROLLER - REMOVAL AND INSTALLATION

1. Referenced Procedure

   30-13-00 Wing Anti-ice System - Adjustment and Test

2. Removal/Installation

   A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - WING - ANTI-ICE - CONT (D22).

   (2) Disconnect electrical connector from overheat controller in mid electrical center, zone 137.

   (3) Remove mounting screws and remove controller.

   B. Installation

   (1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

   (2) Place controller in position and secure with mounting screws.

   (3) Connect electrical connector.

   (4) Remove tag and close circuit breaker opened in Step 2A(1).

   (5) Verify operation of anti-ice system (Ref. 30-13-00).

REGULATING/SHUTOFF VALVE - MAINTENANCE PRACTICES

1. General

A regulating shutoff valve in each wing controls anti-ice air flow. Access to the valves is through access panels 551 NT and 611 NT for left and right wing, respectively.

2. Maintenance Practices

A. Deactivation

R NOTE: This deactivation procedure applies only when an
R aircraft is to be dispatched in accordance with the
R MEL.

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and collar circuit breaker ANTI-ICE - WING - ANTI-ICE - CONT (D22).

(2) On pilots overhead control panel, zone 210, placard WING ANTI-ICE panel SYSTEM INOPERATIVE.

(3) Make appropriate entry in aircraft logbook.

B. Verification (Manifold Not Pressurized)

(1) Remove access panel 551NT or 611NT as necessary for access to wing anti-ice regulating valve.

R WARNING: DO NOT REMOVE GROUND CHECKOUT PLUG FROM VALVE WITH DISTRIBUTION MANIFOLD (REF. 36-14-00) PRESSURIZED.

(2) Remove ground checkout plug from valve body.

(3) View position of valve sleeve through checkout opening to verify that valve is closed.

(4) Replace ground checkout plug.

(5) Replace access panel.

C. Verification (Manifold Pressurized)

(1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, verify circuit breaker
R ANTI-ICE - WING - ANTI-ICE - CONT (D22) is closed.

(2) Verify that distribution manifold is pressurized above 5 psi (Ref. 36-14-00).

(3) On WING ANTI-ICE panel, verify that OPEN light on MANUAL switchlight is out.

(4) Open and tag circuit breaker closed in Step C(1).

REGULATING/SHUTOFF VALVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

   Protective plugs and caps

2. Referenced Procedure

   20-36-01 Single T-Bolt V-Band Coupling - Removal and Installation

   30-13-00 Wing Anti-ice System - Adjustment and Test

3. Removal/Installation

   A. Removal

      (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE WING ANTI-ICE CONT (D22).

      (2) Remove access panel 511NT (left wing) or 611NT (right wing).

      (3) Disconnect electrical connectors from wing anti-ice regulating/shutoff valve and install protective caps.

      (4) Disconnect sense line connector and install protective plug.

      (5) Remove duct joint cover at each side of valve.

      (6) Remove couplings (Ref. 20-36-01) and remove valve.

   B. Installation

      (1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

      (2) Place valve in position and install couplings (Ref. 20-36-01).

      (3) Install duct joint covers.

      (4) Remove protective plug and connect sense line.

      (5) Remove protective caps and connect electrical connectors.

(6) Replace access panel.

(7) Remove tag and close circuit breaker opened in Step 3A(1).

R (8) Verify operation of anti-ice system (Ref. 30-13-00).

DUAL TEMPERATURE SENSOR - REMOVAL AND INSTALLATION

1. Equipment and Materials

CR CR Conductive Grease, Wakefield Engineering Inc., Compound Type 120, DC340, or equivalent.

2. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
30-13-00	Wing Anti-ice System - Adjustment and Test

3. Removal/Installation

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

A. Removal

(1) Extend leading edge slats as follows:

(a) Turn on electrical power (Ref. 24-41-00).

(b) Turn on hydraulic systems A and C (Ref. 29-11-00).

(c) Set flap control handle to 4-degree position. Wait until leading edge slats are fully extended.

(2) Turn off hydraulic power source and relieve system pressure (Ref. 29-11-00).

R WARNING: ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, THE HYDRAULIC SERVICE PANEL, ZONE 147, AND HYDRAULIC GROUND CART.

(3) Tag flap control handle to warn against moving handle to up (0-degree) position.

(4) Turn off electrical power (Ref. 24-41-00).

(5) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - WING - ANTI-ICE - CONT (D22).

(6) On No. 4 slat front beam, locate splices joining sensor wires to self-retracting wires from telescoping conduit. Cut and tag spliced wires.

(7) Lower inspection panel inboard of telescoping duct.

(8) Disengage sensor from its mount by depressing knurled collar and rotating counterclockwise.

(9) Remove sensor by withdrawing sensor lead from conduit.

B. Installation

(1) Verify that circuit breaker opened in Step 3A(5) is open and tagged.

(2) Verify flap control handle is in 4-degree position and tagged.

(3) Install sensor lead in conduit.

(4) Fill cavity in sensor mount with conductive grease.

(5) Install sensor on mount.

(6) Splice sensor wires to telescoping conduit self-retracting wires and remove tags on wires.

(7) Close and secure inspection panel on slat front beam.

(8) Retract leading edge slats as follows:

(a) Turn on electrical power (Ref. 24-41-00).

(b) Remove tags installed at beginning of Step 3A(3).

(c) Turn on hydraulic systems A and C (Ref. 29-11-00).

(d) Remove tag and set flap control handle to up (0-degree) position. Wait until slats and flaps are fully retracted.

(9) Turn off hydraulic power (Ref. 29-11-00).

(10) Verify operation of anti-ice system (Ref. 30-13-00).

(11) Turn off electrical power (Ref. 24-41-00).

(12) Remove tag and close circuit breaker opened in Step 3A(5).

DUAL TEMPERATURE SENSOR - ADJUSTMENT AND TEST

1. General

This procedure specifies the steps to be performed to verify the status of both dual temperature sensors. The procedure is the same for each sensor.

2. Equipment and Materials

Ohmmeter, Simpson P/N 260 Series 6, or equivalent

Thermometer, contact, Pandux 310F 0°-200°F range, or equivalent

3. Adjustment/Test

A. Functional Test

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, Zone 215, open and tag circuit breaker ANTI-ICE - WING - ANTI-ICE - CONT (D22).

(2) On pilots overhead WING ANTI-ICE panel, verify that AUTO and MANUAL switchlights are in off position (flush with panel).

(3) Use contact thermometer on outside of No. 4 slat approximately 42 inches from inboard edge and 10-1/2 inches forward of lower aft edge of slat.

(4) Disconnect electrical connector from wing anti-ice control box in mid electrical service center.

CR (5) Set ohmmeter resistance multiplier selector to X100 or
CR X10,000 as required to observe resistance.

(6) Perform resistance measurements at aircraft wiring connector 3013-P2.

CR (a) Resistance between pins 31 and 19, 30 and 18, 29
CR and 16, and 28 and 15 should read approximately
CR for the following ambient temperatures:

Ohms x 1000 (±10%)	Temperature F°
100.0	0

Ohms x 1000 (±10%)	Temperature F°
44.4	32
35.2	41
28.2	50
22.7	59
18.4	68
15.0	77
12.2	86
10.1	95
8.4	104
6.9	113

NOTE: Ambient temperature less than 0°F will provide a sensor resistance in excess of 100 KOHMS.

(b) Resistance between following pins is infinite at all temperatures: (RX10000 scale on ohmmeter)

31 and 18

31 and 14

30 and 19

30 and 14

29 and 15

29 and 14

28 and 16

28 and 14

(7) Remove ohmmeter.

(8) Connect electrical connector to control box.

WING ANTI-ICE TELESCOPING DUCT - REMOVAL AND INSTALLATION

1. Equipment and Materials

Protective caps

2. Referenced Procedures

20-36-01	Single T-Bolt V-Band Coupling - Removal and Installation
24-41-00	Electrical Power System - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
27-81-00	Leading Edge Slat Control System - Adjustment and Test

3. Removal/Installation

A. Removal

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

(1) Turn on electrical power (Ref. 24-41-00).

(2) Turn on hyraulic system C (Ref. 29-11-00).

R (3) Extend wing leading edge slats to the fully extended position(Ref. 27-81-00).

(4) Turn off hydraulic system C (29-11-00).

(5) Turn off electrical power (Ref. 24-41-00).

R **WARNING:** ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, THE HYDRAULIC SERVICE PANEL, ZONE 147, AND HYDRAULIC GROUND CART.

(6) Open access panel in left wing, zone 521, or access panel in right wing, zone 621, (Ref. Fig. 401).

(7) Remove cover at duct inboard connection.

(8) Disconnect coupling at duct inboard connection (Ref. 20-36-01).

(9) Remove nuts, washers, insulators, and bolts attaching duct to bracket.

(10) Remove bolts, insulators and shims attaching forward end of duct to slat.

(11) Remove nuts, washers, insulators, spacers, and bolts attaching duct to wing front beam.

(12) Remove duct from wing.

B. Installation

(1) Verify that hydraulic systems are off and tagged.

(2) Place duct in mounting position.

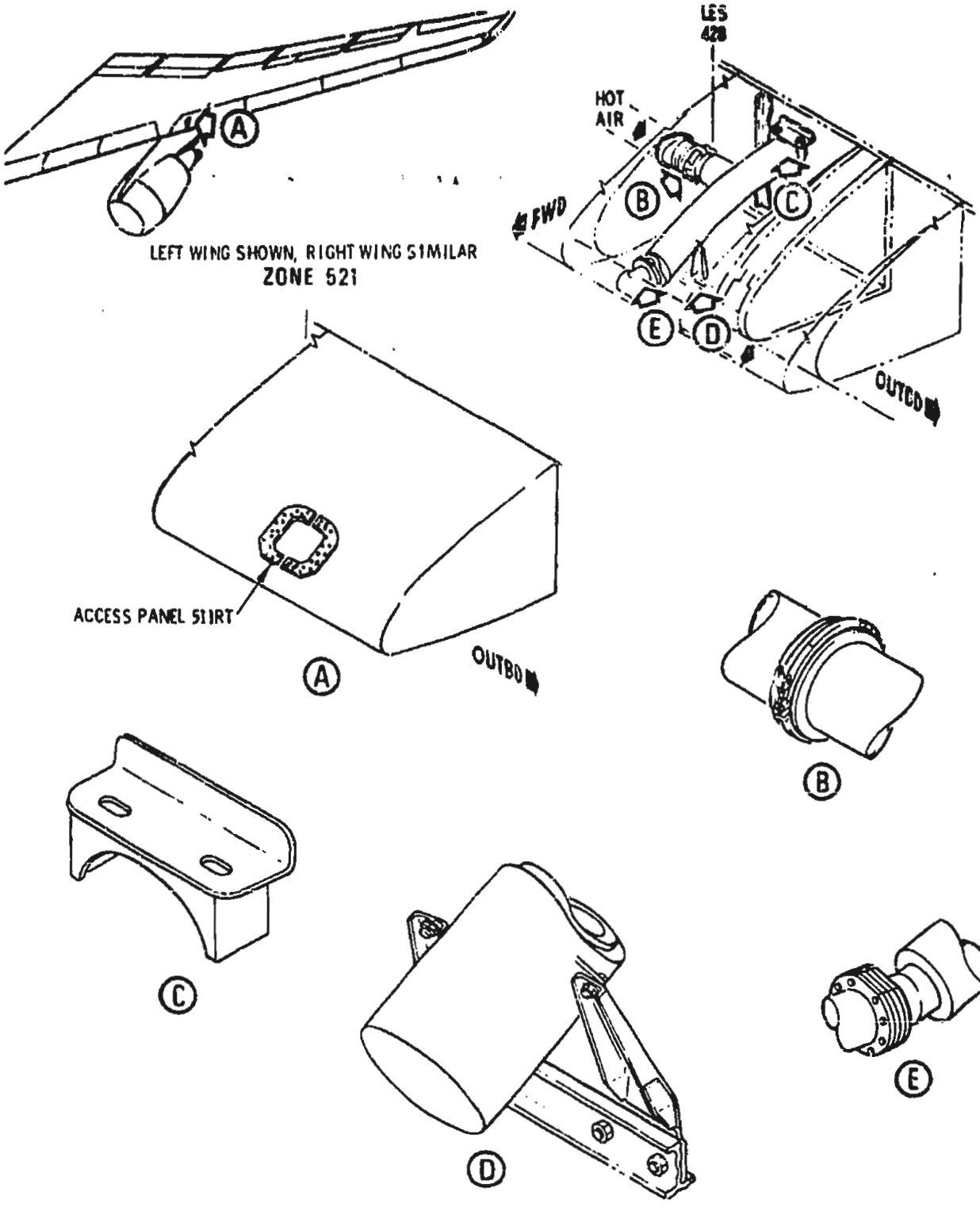
(3) Connect coupling at duct inboard connection (Ref. 20-36-01).

(4) Attach duct to wing front beam with attaching hardware.

(5) Verify minimum of 0.13 inch clearance between duct and opening in fixed leading edge. If necessary the installation may be trimmed to provide 0.13 inch clearance.

(6) Attach duct to slat with one insulator on each side of slats and shims (if needed) between telescopic duct and slat.

(7) Attach duct to bracket.



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R Wing Anti-ice Telescoping Duct - Removal and Installation
R Figure 401

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

(8) Remove tags installed at beginning of Step 3A(6).

(9) Turn on electrical power (Ref. 24-41-00).

(10) Turn on hydraulic system C (Ref. 29-11-00).

R (11) Retract wing leading edge slats(Ref. 27-81-00).

(12) Turn off hydraulic system C (Ref. 29-11-00).

(13) Turn off electrical power (Ref. 24-41-00).

(14) Close and secure access panel.

WING ANTI-ICE TELESCOPING DUCT - REMOVAL AND INSTALLATION

1. Equipment and Materials

Protective caps

2. Referenced Procedures

20-36-01	Single T-Bolt V-Band Coupling - Removal and Installation
24-41-00	Electrical Power System - Maintenance Practices
27-81-00	Leading Edge Slat Control System - Adjustment and Test
29-11-00	Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

(1) Turn on electrical power (Ref. 24-41-00).

(2) Turn on hyraulic system C (Ref. 29-11-00).

R (3) Extend wing leading edge slats to the fully extended position (Ref. 27-81-00).

(4) Turn off hydraulic system C (29-11-00).

(5) Turn off electrical power (Ref. 24-41-00).

R WARNING: ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, THE HYDRAULIC SERVICE PANEL, ZONE 147, AND HYDRAULIC GROUND CART.

(6) Open access panel in left wing, zone 521, or access panel in right wing, zone 621, (Ref. Fig. 401).

(7) Remove cover at duct inboard connection.

(8) Disconnect coupling at duct inbcard connection (Ref. 20-36-01).

(9) Remove nuts, washers, insulators, spacers, and bolts attaching duct to wing front beam.

(10) Remove nuts, washers, insulators, shims and bolts attaching duct to slat.

(11) Remove nuts, washers, insulators and bolts attaching duct to bracket.

(12) Remove duct from wing.

B. Installation

(1) Verify that hydraulic systems are off and tagged.

(2) Place duct in mounting position.

(3) Connect coupling at duct inboard connection (Ref. 20-36-01).

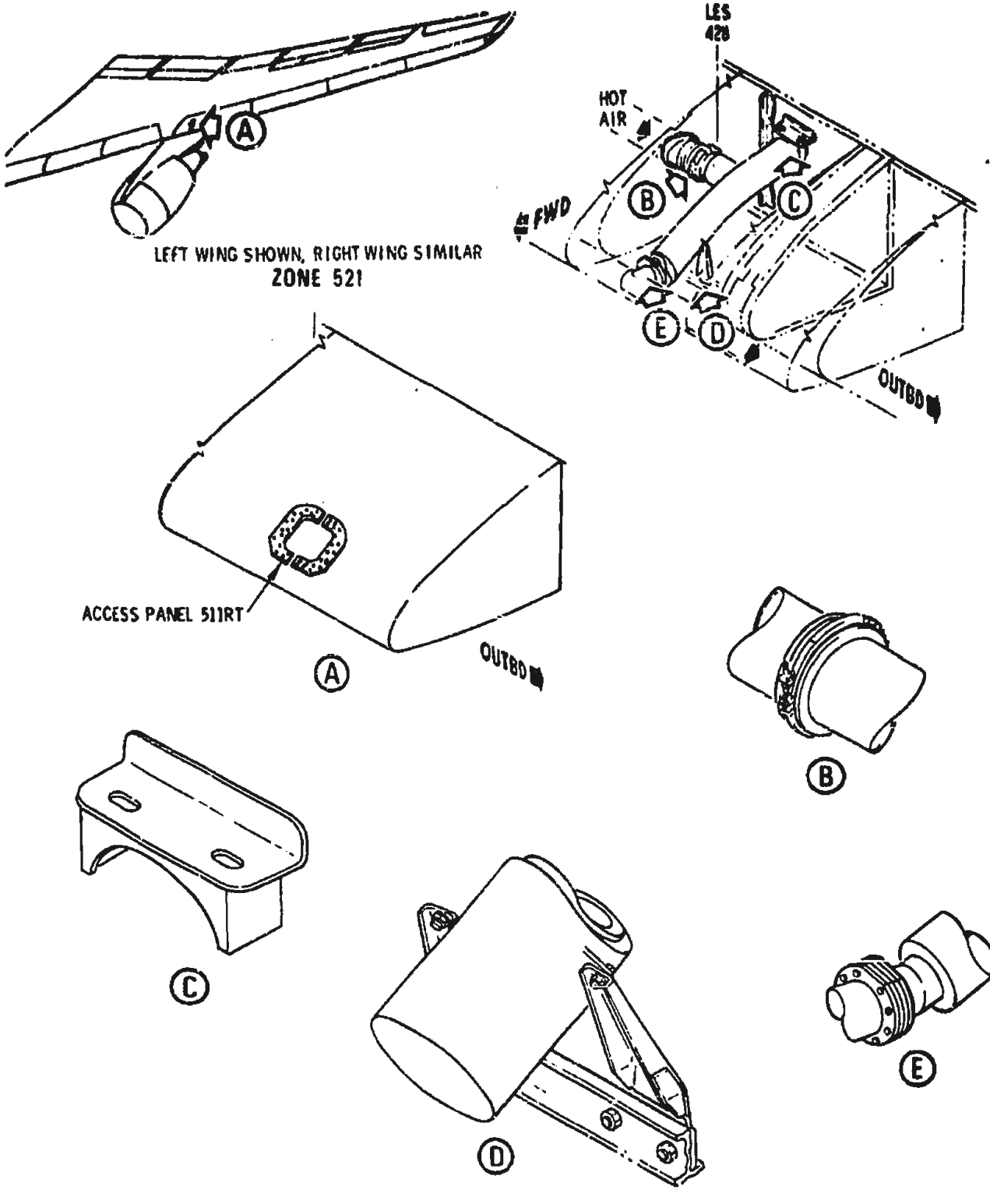
(4) Attach duct to wing front beam with attaching hardware.

(5) Attach telescopic duct front end (Ref. Fig. 401) to slat and slat duct, with one insulator on each side of the slat. To compensate for angular vertical misalignment in either direction use shims as required (up to 4) and tighten nuts.

(6) Verify minimum of 0.13 inch clearance between duct and opening in fixed leading edge. If necessary installation may be trimmed to provide 0.13 inch clearance.

(7) Attach duct to bracket (Ref. Fig. 401).

(8) Loosen lower end of both brackets from the slat and separate serrated plates from both brackets.



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R Wing Anti-ice Telescoping Duct - Removal and Installation
R Figure 401

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

(9) Remove tags installed at beginning of Step 3A(6).

(10) Turn on electrical power (Ref. 24-41-00).

(11) Turn on hydraulic system C (Ref. 29-11-00).

(12) Retract wing leading edge slats (Ref. 27-81-00).

(13) Turn off hydraulic system C (Ref. 29-11-00).

(14) Turn off electrical power (Ref. 24-41-00).

R WARNING: ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE SHUT OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, THE HYDRAULIC SERVICE PANEL, ZONE 147, AND HYDRAULIC GROUND CART.

(15) Align inner and outer duct of telescopic duct to be concentric within 0.030 inch at forward end of outer duct. Close both pair of serrated plates at lower end of brackets and tighten nuts.

(16) Remove tags installed at beginning of Step 3B(14).

(17) Close and secure access panel.

R NO. 5 AND 6 SLAT PICCOLO DUCTS - REMOVAL AND INSTALLATION

R 1. General

R The following removal and installation procedure is applicable
R for the left and right wing No. 5 and 6 slat piccolo ducts.

R 2. Referenced Procedure

R 30-13-16 Duct Connector - Removal and Installation

R 3. Removal/Installation

R A. Removal

R (1) Remove duct connectors (Ref. 30-13-16).

R (2) Remove slat access panels.

R (3) Disengage all clamps from piccolo duct (Ref. Fig. 401).

R CAUTION: EXERCISE CARE TO PREVENT DAMAGE TO DUCT AND
R INSULATION. DO NOT BANG OR SCRAPE DUCT.

R (4) Slide duct out inboard end of slat.

R B. Installation

R CAUTION: EXERCISE CARE TO PREVENT DAMAGE TO DUCT AND
R INSULATION. DO NOT BANG OR SCRAPE DUCT.

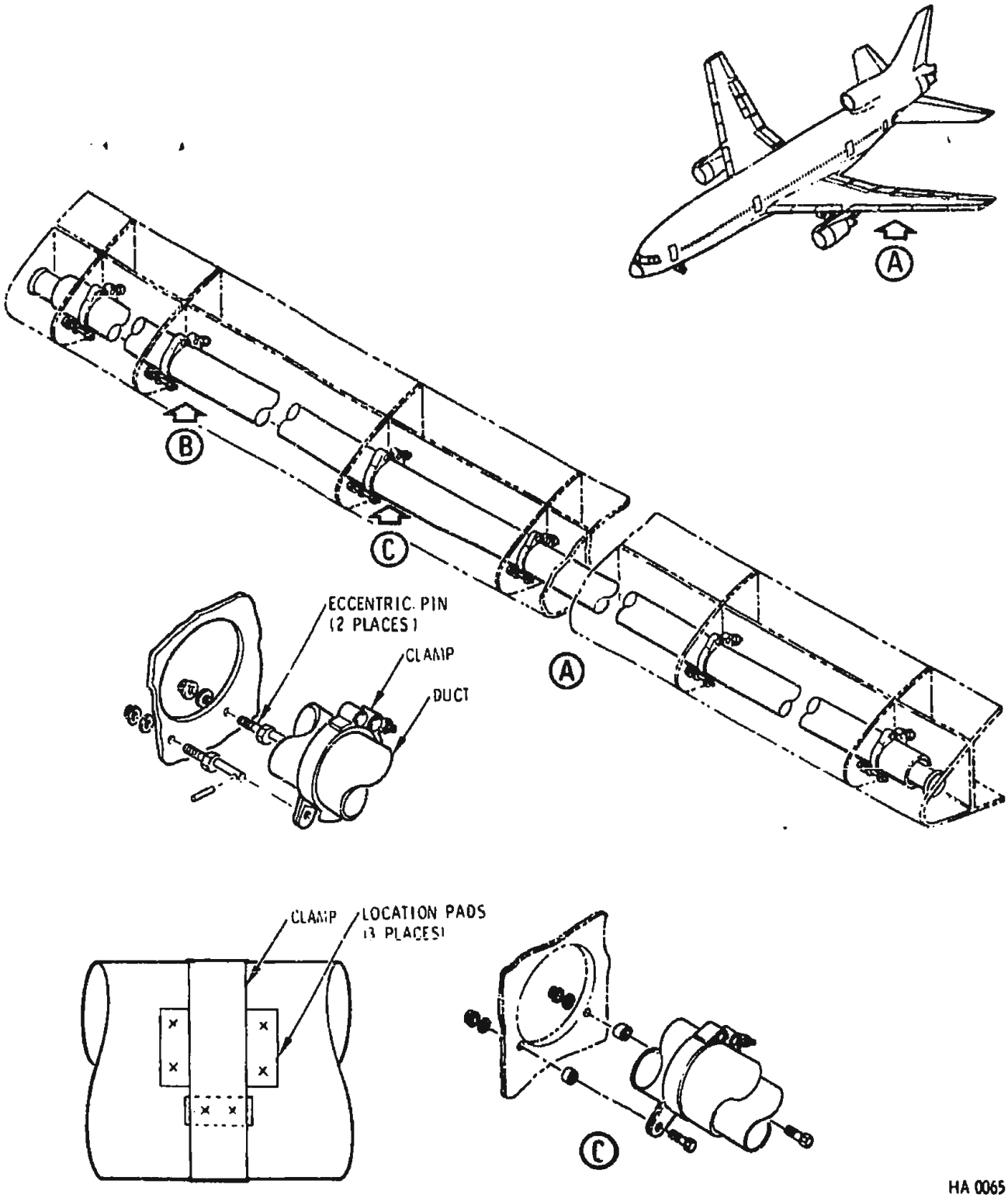
R (1) Insert smaller end of piccolo duct through inboard end
R of slot and feed through slat webs and clamps into
R mounting position.

R (2) Position clamps at duct location pads and tighten
R clamps.

R NOTE: Bracket eccentric pins may be adjusted to
R position ducts.

R (3) Install slat access panels.

R (4) Install duct connectors (Ref. 30-13-16).



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R
R Slat Piccolo Duct - Removal and Installation
Figure 401

R # NO. 7 SLAT PICCOLO DUCT - REMOVAL AND INSTALLATION

R 1. General

R The following removal and installation procedure is applicable
R for the left and right wing No. 7 slat piccolo ducts.

R 2. Referenced Procedures

R 20-36-01 Single T-bolt V-band Coupling - Removal and
R Installation

R 30-13-16 Duct Connector - Removal and Installation

R 3. Removal/Installation

R A. Removal

R (1) Remove duct connector (Ref. 30-13-16).

R (2) Remove slat access panels.

R (3) Remove end rib fairing.

R CAUTION: EXERCISE CARE TO PREVENT DAMAGE TO DUCT AND
R INSULATION. DO NOT BANG OR SCRAPE DUCT.

R (4) Remove coupling (Ref. 20-36-01) joining inboard and
R outboard piccolo ducts (Ref. Fig. 401).

R (5) Disengage all clamps from outboard piccolo duct.

R (6) Slide duct out outboard end of slat.

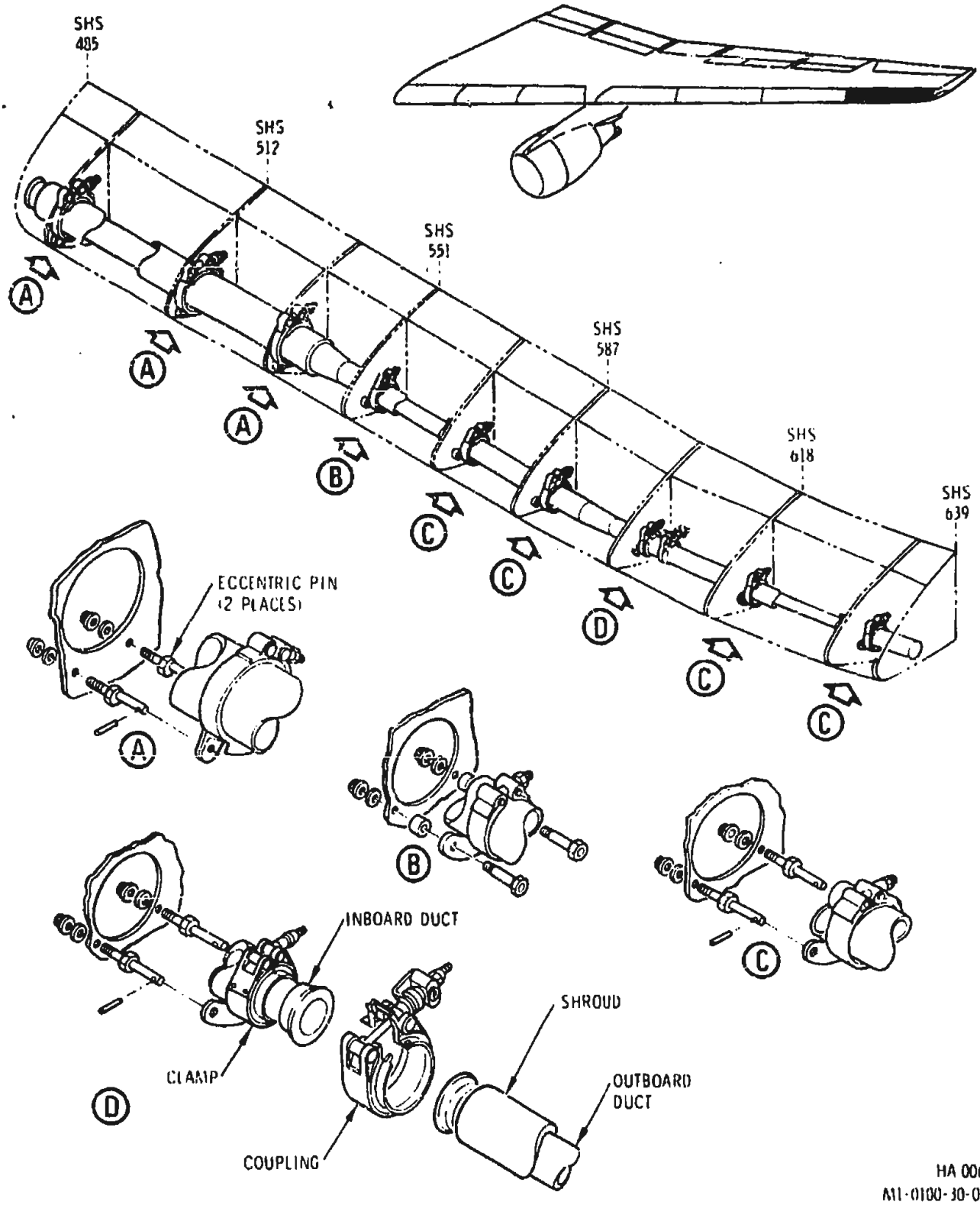
R (7) Disengage all clamps from inboard piccolo duct.

R (8) Slide duct out inboard end of slat.

R B. Installation

R CAUTION: EXERCISE CARE TO PREVENT DAMAGE TO DUCT AND
R INSULATION. DO NOT BANG OR SCRAPE DUCT.

R (1) Insert open end of outboard piccolo duct through
R outboard end of slat and feed through slat webs and
R clamps into mounting position.



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R No. 7 Slat Piccolo Duct - Removal and Installation
R Figure 401

R (2) Insert smaller end of inboard piccolo duct through
R inboard end of slat and feed through slat webs and
R clamps into mounting position.

R (3) Join inboard and outboard piccolo ducts with coupling
R (Ref. 20-36-01).

R (4) Position clamps on piccolo ducts and tighten clamps.

R NOTE: Bracket eccentric pins may be adjusted to
R position ducts.

R (5) Install slat access panels.

R (6) Install end rib fairing.

R (7) Install duct connector (Ref. 30-13-16).

DUCT CONNECTORS AND PRESSURE SEALS - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for all piccolo duct connectors and duct pressure seals.

2. Referenced Procedures

	27-51-00	Wing Trailing Edge Flaps and Leading Edge Slat Systems - Adjustment and Test
	27-81-26	Outboard Slats - Removal and Installation
	30-13-00	Wing Anti-ice System - Maintenance Practices
R	30-13-16	Duct Connector - Leak Check

3. Removal/Installation

A. Removal

CAUTION: BE SURE THAT FLAP AND LEADING EDGE SLAT AREAS ARE CLEAR BEFORE OPERATION. SLATS OPERATE IN CONJUNCTION WITH TRAILING EDGE FLAPS.

(1) Extend the leading edge slats (Ref. 27-51-00).

WARNING: RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(2) Tag WING ANTI-ICE panel on pilots overhead panel to prevent system operation until completion of procedures.

(3) Remove interslat seals and bumper fittings from affected slats (Ref. 27-81-26).

(4) Remove duct connector access panels from affected slat and adjoining slat (Ref. Fig. 401).

(5) Retract slats approximately 6 inches (Ref. 27-51-00).

(6) Disconnect duct connector retainer and clamp on piccolo duct in slat adjoining affected slat.

(7) Disconnect slat actuator from slat (Ref. 27-81-26).

CAUTION: DO NOT ROTATE ACTUATOR END.

(8) Compress duct connector and seal to clear adjoining slat, then move slat forward to expose duct ends.

(9) Disconnect duct connector retainer and clamp, then remove duct connector and seal from forward slat.

B. Installation

(1) Assemble duct connector, seal, retainer, and clamp in proper sequence before installation (Ref. Fig. 401).

(2) Install duct connector assembly on lowered slat duct and tighten clamp.

(3) Position retainer between duct seal and outer lip of plenum chamber. Expand retainer to seal plenum chamber.

(4) Compress duct connector assembly to clear adjoining slat, move slat aft and connect slat actuator (Ref. 27-81-26).

(5) Install duct connector assembly on slat duct and tighten clamp.

(6) Position retainer between duct seal and outer lip of plenum chamber. Expand retainer to seal plenum chamber.

(7) Fully extend slats (Ref. 27-51-00).

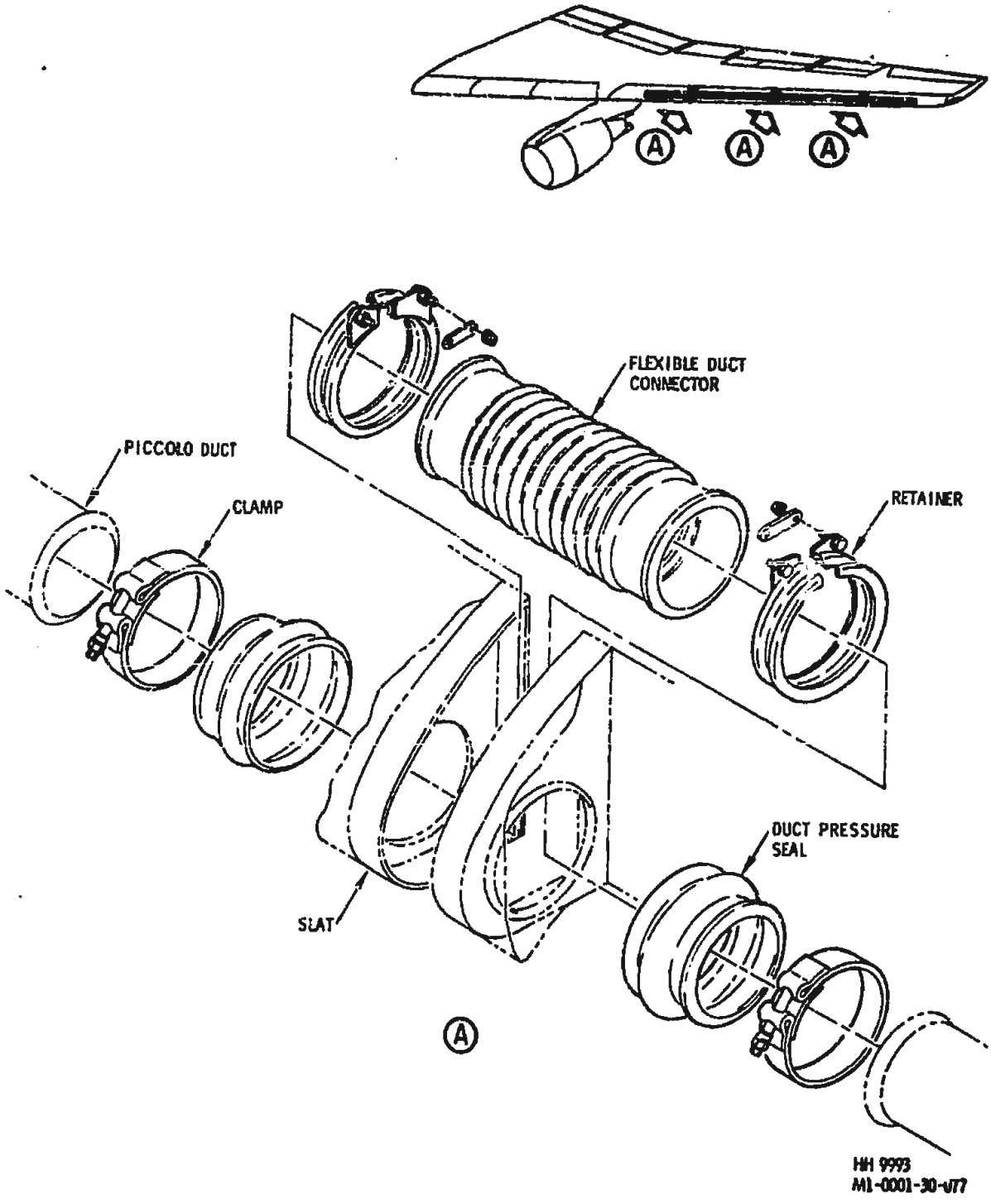
(8) Install interslat seals and bumper fittings (Ref 27-81-26).

(9) Install duct connector access panels.

(10) Remove tag installed on WING ANTI-ICE panel in Step 3A(2).

(11) Check leading edge slat system (Ref. 27-51-00).

R (12) Perform Duct Connector Check (Ref. 30-13-16) Duct
R Connector Adjustment and Test.



Duct Connectors and Pressure Seals - Removal and Installation
Figure 401

CAUTION: DURING WING ANTI-ICE OPERATION, MAXIMUM SLAT LEADING EDGE SKIN TEMPERATURE IS APPROXIMATELY 225°F (107°C). DO NOT USE ENGINE BLEED AIR FOR WING ANTI-ICE SYSTEM GROUND TEST FOR MORE THAN THREE TO FIVE MINUTES AT A TIME. ALLOW SKIN TO COOL TO AMBIENT TEMPERATURE BETWEEN TESTS.

R (13) Operate wing anti-ice system and check for leaks (Ref. 30-13-00).

R DUCT CONNECTOR - ADJUSTMENT AND TEST

R 1. Leak Check Duct Connectors

R A. General

R The following leak check procedure is applicable for all duct
R connectors.

R B. Reference Procedures

R 24-41-00 External Power/Ground Service System - Maintenance
R Practices

R 27-51-00 Wing Trailing Edge and Leading Edge Slat Systems -
R Adjustment and Test

R 30-13-00 Wing Anti-Ice System - Adjustment and Test

R 30-13-16 Duct Connector - Removal and Installation

R 36-13-00 High Pressure Ground Air System - Maintenance
R Practices

R C. Leak Check Procedure

R (1) Apply electrical power (Ref. 24-41-00).

R (2) Extend leading edge slats to the full extend position
R (Ref. 27-51-00; 36-13-00).

R (3) Operate wing anti-ice system (Ref. 30-13-00) and check
R for air leaks at 6 each duct connectors. Connectors
R can be accessed from rear of slat. Reference 30-13-00
R Wing Anti-Ice System Description and Operation for
R location of ducts.

R NOTE: No air leaks are allowed at flexible duct
R connector.

R (4) Replace leaking duct connector (Ref. 30-13-16, Duct
R Connectors - Removal/Installation).

R DUCT PRESSURE SEAL - REMOVAL AND INSTALLATION

R 1. General

R The following removal and installation procedure is applicable
R for all piccolo duct pressure seals.

R 2. Referenced Procedure

R 30-13-16 Duct Connector - Removal and Installation

R 3. Removal/Installation

R A. Removal

R (1) Remove duct connector (Ref. 30-13-16); the referenced
R procedure includes seal removal.

R B. Installation

R (1) Install duct connector (Ref. 30-13-16); the referenced
R procedure includes seal installation.

WING ANTI-ICE SELF-RETRACTING WIRE - REMOVAL AND INSTALLATION

1. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
27-81-00	Leading Edge Slat Control System - Adjustment and Test
29-11-00	Hydraulic Power System - Maintenance Practices

2. Removal/Installation

A. Removal

(1) Extend wing leading edge slats to fully extended position (Ref. 27-81-00).

(2) Turn off hydraulic system (Ref. 29-11-00).

(3) Turn off electrical power (Ref. 24-41-00).

(4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - ANTI-ICE - CONT (D22).

WARNING: ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE TURNED OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, THE HYDRAULIC SERVICE PANEL, ZONE 147, AND THE HYDRAULIC GROUND CART.

(5) Open access panel in wing, zone 521 or 621, below telescoping conduit.

(6) On wing beam, disconnect self-retracting wire from terminal block 3013-TB5 (left wing) or 3013-TB8 (right wing). Tag terminal block terminals. Cut terminal lugs off telescoping wire.

R (7) On aircraft with SB24-118,
R remove wire from clamp adjacent to aft end of fixed
R section of telescoping conduit.

R (8) On No. 4 slat front beam, locate splices joining self-retracting wires to dual-temperature sensor wires. Cut and tag spliced wires.

R (9) Remove hardware which attaches movable section of telescoping conduit to slat (Ref. Fig. 401).

R (10) Remove movable section of telescoping conduit. Remove self-retracting wire.

B. Installation

(1) Verify that Steps 2A(1) through 2A(5) have been accomplished.

(2) Feed self-retracting wire through fixed section of telescoping conduit and fish out through aft grommet. Pull wire through grommet until heavier insulated section is exposed.

(3) Feed forward end of self-retracting wire through wire guides inside movable section of telescoping conduit. Pull wire out through forward grommet until heavier insulated section is exposed.

(4) Insert movable section of telescoping conduit into fixed section.

(5) Attach telescoping conduit to slat with attaching hardware.

(6) Remove tags and splice forward end of self-retracting wire to dual-temperature sensor wires.

(7) Connect terminal lugs to aft end of self-retracting wire.

(8) Remove tags and connect wires to terminal block.

R (9) On aircraft with SB24-118,
R install wire in clamp adjacent to aft end of fixed
R section of telescoping conduit.

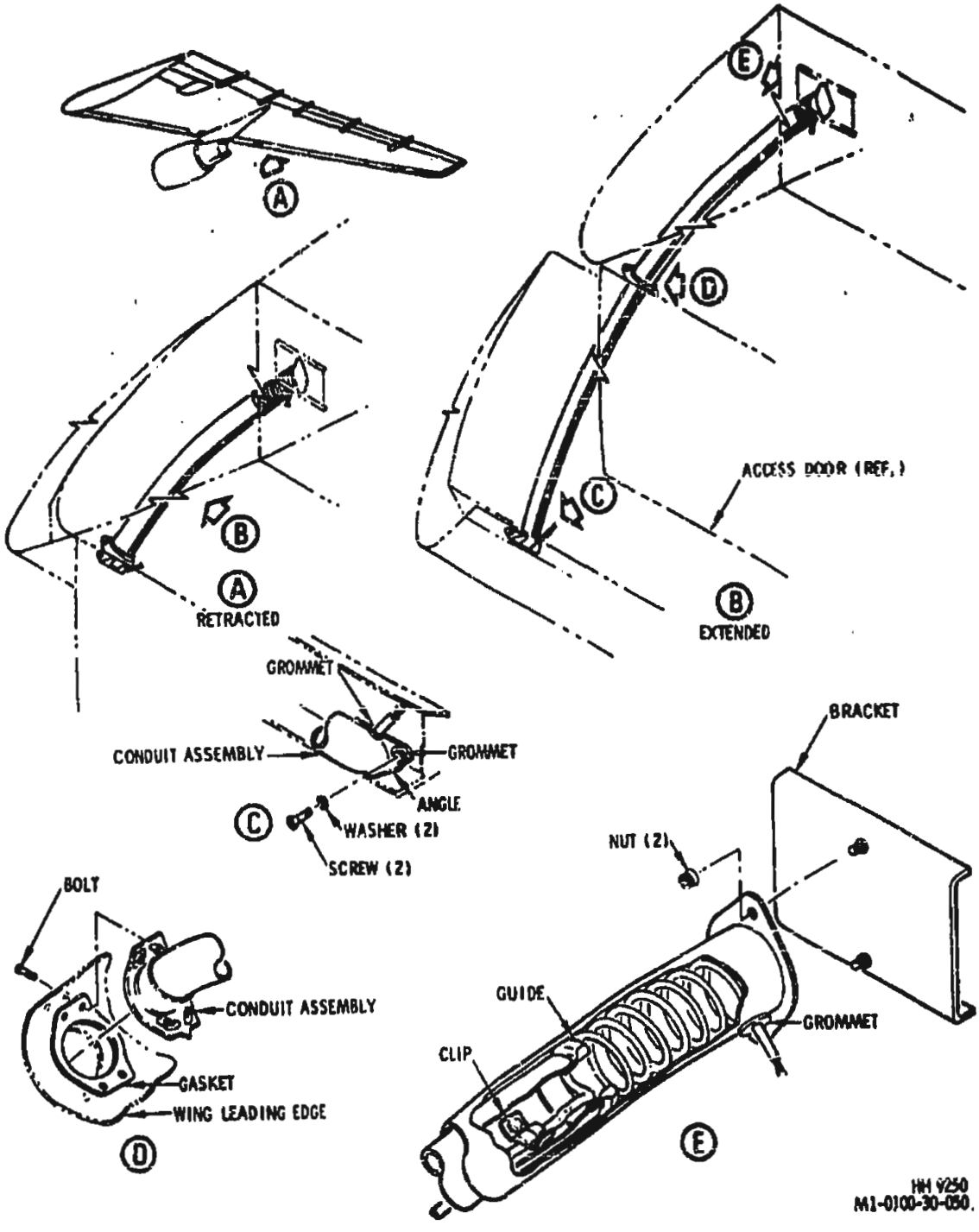
R (10) Remove tag and close circuit breaker opened in Step
R 2A(4).

R (11) Extend and retract leading edge slats while observing telescoping conduit for freedom of operation (Ref. 27-81-00).

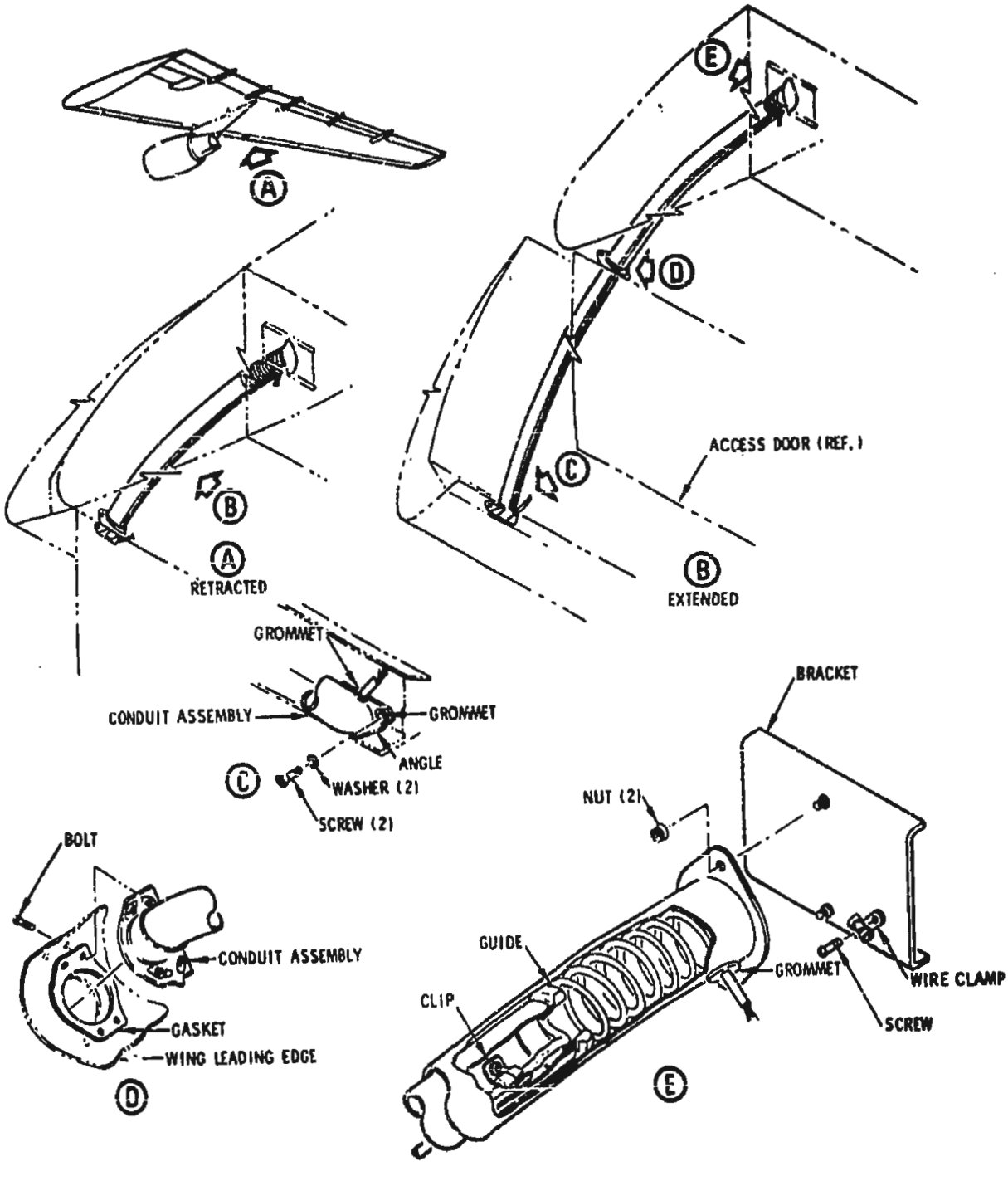
R (12) Turn off hydraulic system (Ref. 29-11-00).

R (13) Turn off electrical power (Ref. 24-41-00).

R (14) Close and secure access panel opened in Step 2A(5).



Anti-ice Telescoping Conduit - Removal and Installation
Figure 401



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R Anti-ice Telescoping Conduit - Removal and Installation
R Figure 401

EXCESS FLOW SENSING PROBE - REMOVAL AND INSTALLATION

1. Removal/Installation

A. Removal

(1) Remove access panel 511LB (left wing) or 611LB (right wing).

(2) Disconnect pressure sense line connector at excess flow sensing probe.

(3) Remove probe mounting bolts and nuts and remove probe.

B. Installation

(1) Check that O-ring (Parker No. 2-26) on probe mounting flange is in place and is serviceable.

(2) Place probe in position and install mounting bolts and nuts.

(3) Check that O-ring packing is in place on pressure sense line, then connect line to probe.

(4) Replace access panel.

PRESSURE RATIO SWITCH - REMOVAL AND INSTALLATION

1. Equipment and Materials

   Protective plugs and caps

2. Removal/Installation

   A. Removal

      (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker WING ANTI-ICE CONT.

      (2) Remove access panel 511LB (left wing) or 611LB (right wing).

      (3) Disconnect electrical connector from pressure ratio switch and install protective caps.

      (4) Disconnect static and pressure sense line connectors and install protective plugs.

      (5) Remove mounting screws and remove switch.

   B. Installation

      (1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

      (2) Place switch in position and install mounting screws.

      (3) Remove protective plugs and connect static and pressure sense lines.

      (4) Remove protective caps and connect electrical connector.

      (5) Replace access panel.

      (6) Remove tag and close circuit breaker opened in Step 2A(1).

TELESCOPING CONDUIT ASSEMBLY - REMOVAL AND INSTALLATION

1. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
27-81-00	Leading Edge Slat Control System - Adjustment and Test
29-11-00	Hydraulic Power System - Maintenance Practices

2. Removal/Installation

A. Removal

(1) Extend wing leading edge slats to fully extended position (Ref. 27-81-00).

(2) Turn off hydraulic system (Ref. 29-11-00).

(3) Turn off electrical power (Ref. 24-41-00).

(4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - WING - ANTI-ICE - CONT (D22).

WARNING: ENSURE THAT ALL FOUR HYDRAULIC SYSTEMS ARE TURNED OFF (REF. 29-11-00). TAG FLIGHT ENGINEER/SECOND OFFICERS HYDRAULIC SYSTEM PANEL, ZONE 215, THE HYDRAULIC SERVICE PANEL, ZONE 147, AND THE HYDRAULIC GROUND CART.

(5) Open access panel in wing, zone 521 (left wing) or zone 621 (right wing), below telescoping conduit.

(6) On wing beam, disconnect self-retracting wire from terminal block 3013-TB5 (left wing) or 3013-TB8 (right wing). Tag terminal block terminals. Cut terminal lugs off self-retracting wire.

R (7) On aircraft with SB24-118,
R remove wire from clamp adjacent to aft end of fixed
R section of telescoping conduit.

R (8) On No. 4 slat front beam, locate splices joining self-retracting wire to dual-temperature sensor wires. Cut and tag spliced wires.

R (9) Remove hardware which attaches movable section of telescoping conduit to slat (Ref. Fig. 401).

R (10) Remove movable section of telescoping conduit. Remove self-retracting wire.

R (11) Remove hardware and gasket attaching forward end of fixed section of telescoping conduit to wing leading edge.

R (12) Remove nuts attaching aft end of telescoping conduit to studs on mounting bracket.

R (13) Remove telescoping conduit and aft gasket.

B. Installation

(1) Verify that Steps 2A(1) through 2A(5) have been accomplished.

(2) Place fixed section of telescoping conduit in position with gaskets, and secure aft end to mounting studs.

(3) Attach forward end of telescoping conduit to wing leading edge with attaching hardware.

(4) Feed self-retracting wire through fixed section of telescoping conduit and fish out through aft grommet. Pull wire through grommet until heavier insulated section is exposed.

(5) Feed forward end of self-retracting wire through wire guides inside movable section of telescoping conduit. Pull wire out through forward grommet until heavier insulated section is exposed.

(6) Insert movable section of telescoping conduit into fixed section.

(7) Attach telescoping conduit to slat with attaching hardware.

(8) Remove tags and splice forward ends of self-retracting wire to dual-temperature sensor wires.

(9) Connect terminal lugs to aft ends of self-retracting wire.

(10) Remove tags and connect wires to terminal block.

R (11) On aircraft with SB24-118,
R install wire in clamp adjacent to aft end of fixed
R section of telescoping conduit.

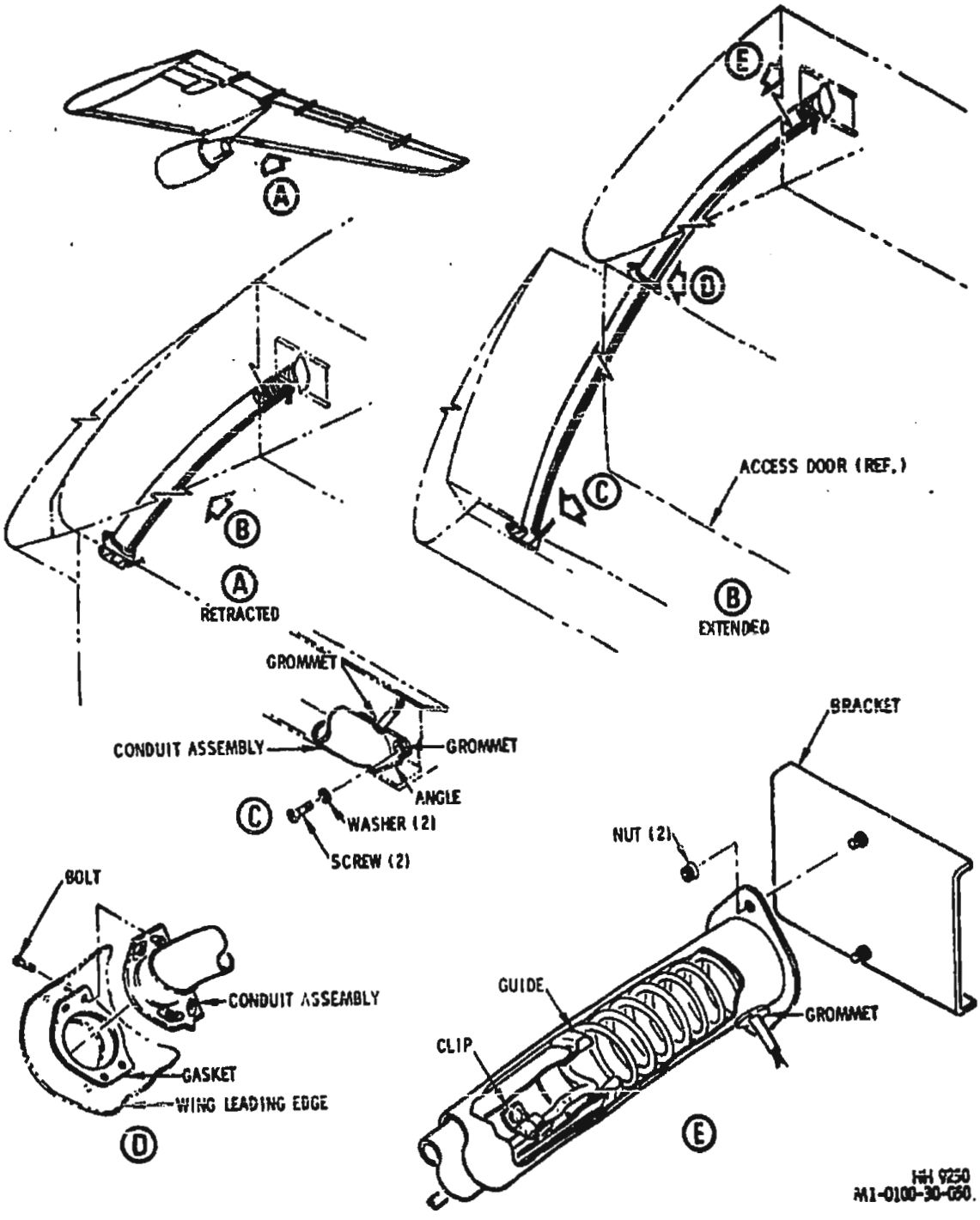
R (12) Remove tag and close circuit breaker opened in Step 2A(4).

R (13) Extend and retract leading edge slats while observing telescoping conduit for smooth operation (Ref. 27-81-00).

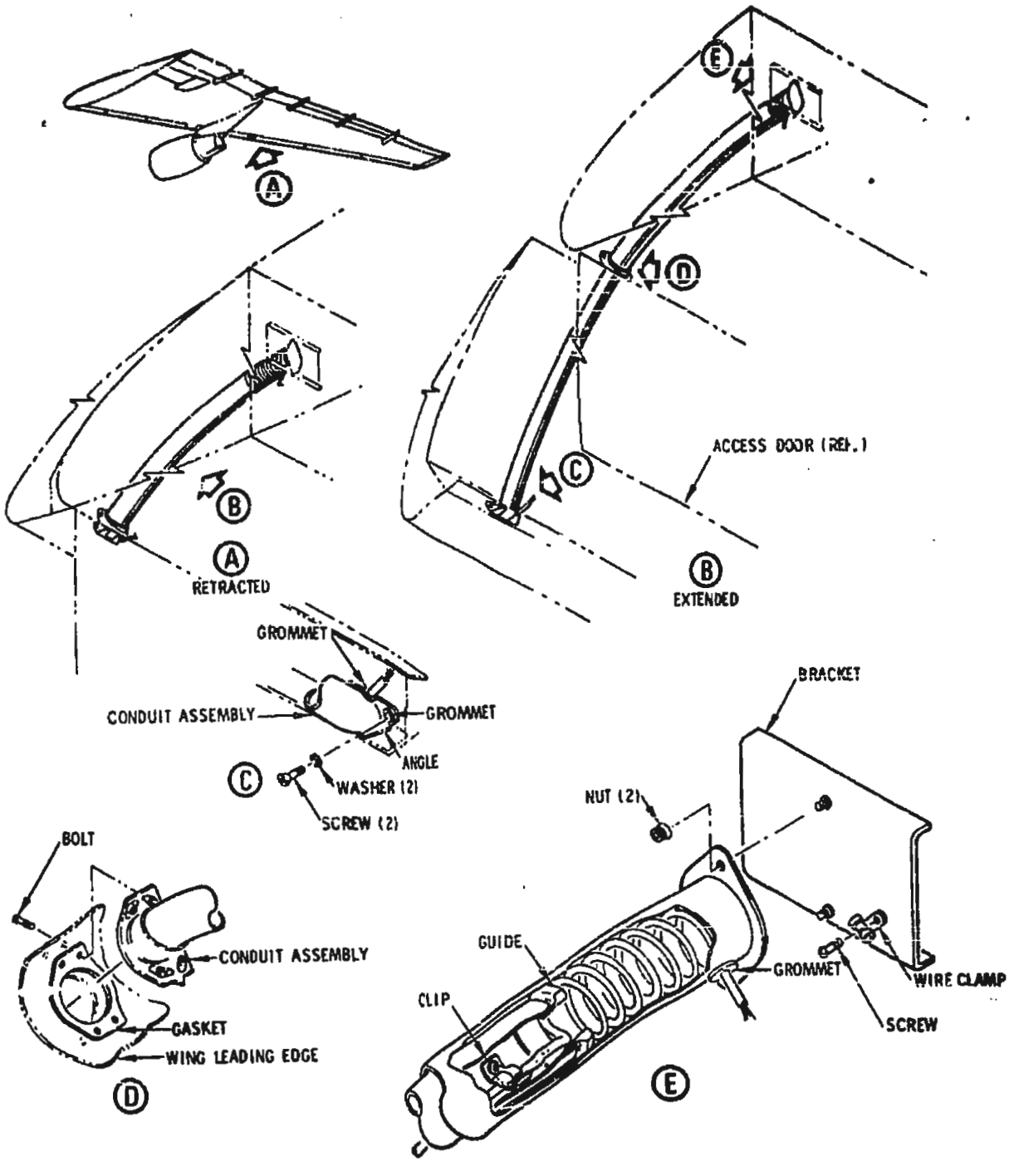
R (14) Turn off hydraulic system (Ref. 29-11-00).

R (15) Turn off electrical power (Ref. 24-41-00).

R (16) Close and secure access panel opened in Step 2A(5).



Anti-ice Telescoping Conduit - Removal and Installation
Figure 401



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R Anti-ice Telescoping Conduit - Removal and Installation
R Figure 401

R EFFECTIVITY: WITH SB24-118
R
0018

ENGINE INLET ANTI-ICING SYSTEM DESCRIPTION AND OPERATION

1. General

Ice tends to form on engine inlet nose cowls because of the high air flow over these areas. The engine inlet anti-icing system prevents this by distributing warm bleed air across the inner skin of the engine nose cowl. It also delivers warm bleed air to the P1 pressure probe (Ref. 73-21-00) to prevent icing of this sensor.

2. Description (Ref. Fig. 1 and 2)

Each engine inlet anti-icing system receives bleed air from the intermediate bleed air pressure duct of the corresponding engine (Ref. 36-11-00). This air passes through ducts to a regulator/shutoff valve. If the valve is open, air goes through ducts to a distributor ring inside the engine inlet nose cowl. A smaller duct downstream of the valve also directs air around the hollow body of the P1 probe where it passes out into the engine air inlet area. At the distributor ring, air passes out through holes in the ring, directing air flow across the cowl's inner skin. Air passes out of the cowl through a slotted diffuser ring exhausting into the engine air inlet. A spring loaded pneumatic relief valve prevents overpressuring of the nose cowl.

3. Operation (Ref. Fig. 3)

Each of the three anti-icing systems is controlled by the engine anti-ice control panel on the pilots overhead panel. The system
R turns on when the applicable switchlight is latched in.

NOTE: On aircraft 001-031 without SB30-043, the switchlight for engine No. 2 also supplies power to the VHF antenna anti-ice system (Ref. 30-51-00).

R When the switchlight is latched in, the white ON legend comes on. This does not necessarily indicate that the system is functioning, only that the switch is latched.

The switchlight allows power to the regulator/shutoff valve solenoid, which causes the valve to open enough to regulate pressure downstream to between 24 psig and 28 psig.

R When downstream pressure near the distributor ring reaches 5
R psig, (at approximately 75% N3 SPEED), the engine anti-ice low

R pressure switch closes, turning on the corresponding HEAT light
R on the Engine Anti-Ice panel. Under normal conditions, the HEAT
R light is illuminated at all engine power settings above ground
R idle, but is not illuminated at ground idle power because the IP
R pressure does not reach 5 psig. This light indicates that the
R system is functioning. Barring a defective HEAT annunciator
R light, failure of the HEAT annunciator to come on with the
R anti-ice switch light ON legend on, and the Anti-Ice valve open
R above ground idle power, (valve position is determined by
R observing valve position indicator on valve), is indicative of a
R duct rupture or major duct leak. In this case, it is
R recommended that the Anti-Ice valve be manually closed to
R prevent further damage. Inspection of all ducting downstream of
R the valve for leaks and supporting structure for damage all
R around the nose cowl periphery is required for final resolution
R of the problem.

R If pressure near the distributor ring exceeds 40 psig in the
R Engine No. 1 and No. 3 system or 25 psig in the Engine No. 2
R system, the Engine Anti-Ice high pressure switch closes, turning
R ON the HI PRESSURE legend on the corresponding switchlight.
R This indicates that the regulator/shut off valve is allowing too
R much pressure to pass through.

NOTE: The engine No. 2 anti-icing high pressure switch closes at 25 psig, rather than 40 psig as in the No. 1 and No. 3 systems, to allow for loss of air pressure in the long duct between the pressure regulator and the distributor ring.

4. Regulator/Shutoff Valve (Ref. Fig. 4)

The regulator/shutoff valve, as its name implies, has two functions; to shutoff airflow to the system when power is not supplied to the solenoid; and to regulate pressure downstream when power is supplied to the solenoid.

The valve consists of a movable piston inside a cylinder. Behind the piston is a chamber with its only outlet opening to the control block. The control block, consisting of a servo-valve and pressure regulator, controls pressure inside the chamber.

The front face of the piston is toward the air outlet of the valve. When the piston moves, outlet ports on the side of the cylinder change size, restricting air flow to the valve outlet.

To shut off the valve, the solenoid is de-energized. The servo-valve then opens to ambient air pressure, allowing any pressure in the chamber behind the piston to pass out through restrictors. If the piston is not back all the way the outlet

ports will allow pressure into the area in front of the piston until the piston is forced back enough that the outlets are completely closed. No air is then able to pass through the valve.

When the solenoid is energized, the servo valve acts to divert inlet air pressure through restrictors into the chamber behind the piston. The pressure regulator on the control block regulates this pressure to 24 to 28 psig before air enters the chamber.

The pressure in the chamber, forces the piston forward so that the outlet ports are opened enough to allow pressure to equalize on either side of the piston. The pressure of the outlet air must then be the same as in the chamber (24 to 28 psig).

On aircraft 001-027, 030-999 with RR SB30-2178, and 028-029, a manual override control is incorporated on the valve to allow the valve to be locked in the open position. Placing the control in the override position by-passes and overrides the solenoid and pressure regulator functions causing the valve to be held in the full-flow open position.

5. Ducting (Ref. Fig. 1 and 2)

Ducting in the engine inlet anti-icing systems have integral gimbal joints at certain points to allow for movement of the airframe structure. E-seals between all mating duct V-flanges prevent leakage. V-band coupling clamps (Ref. 70-12-02) secure V-flange couplings.

Flexible hoses and rigid tubes connect main duct to P1 probe.

Yellow flash points on the ducts aid in correct alignment of components. On engines No. 1 and No. 3 a pressure seal at the point the ducting passes through the nose cowl rear diaphram (near the fan blades) prevents air from leaking around duct.

On aircraft 001-027, 030-999 with RR SB30-2171, and 028-029, a test connector is connected into the duct between the intermediate pressure bleed air duct connection and the regulator/shutoff valve for engine No. 1 and No. 3 systems.

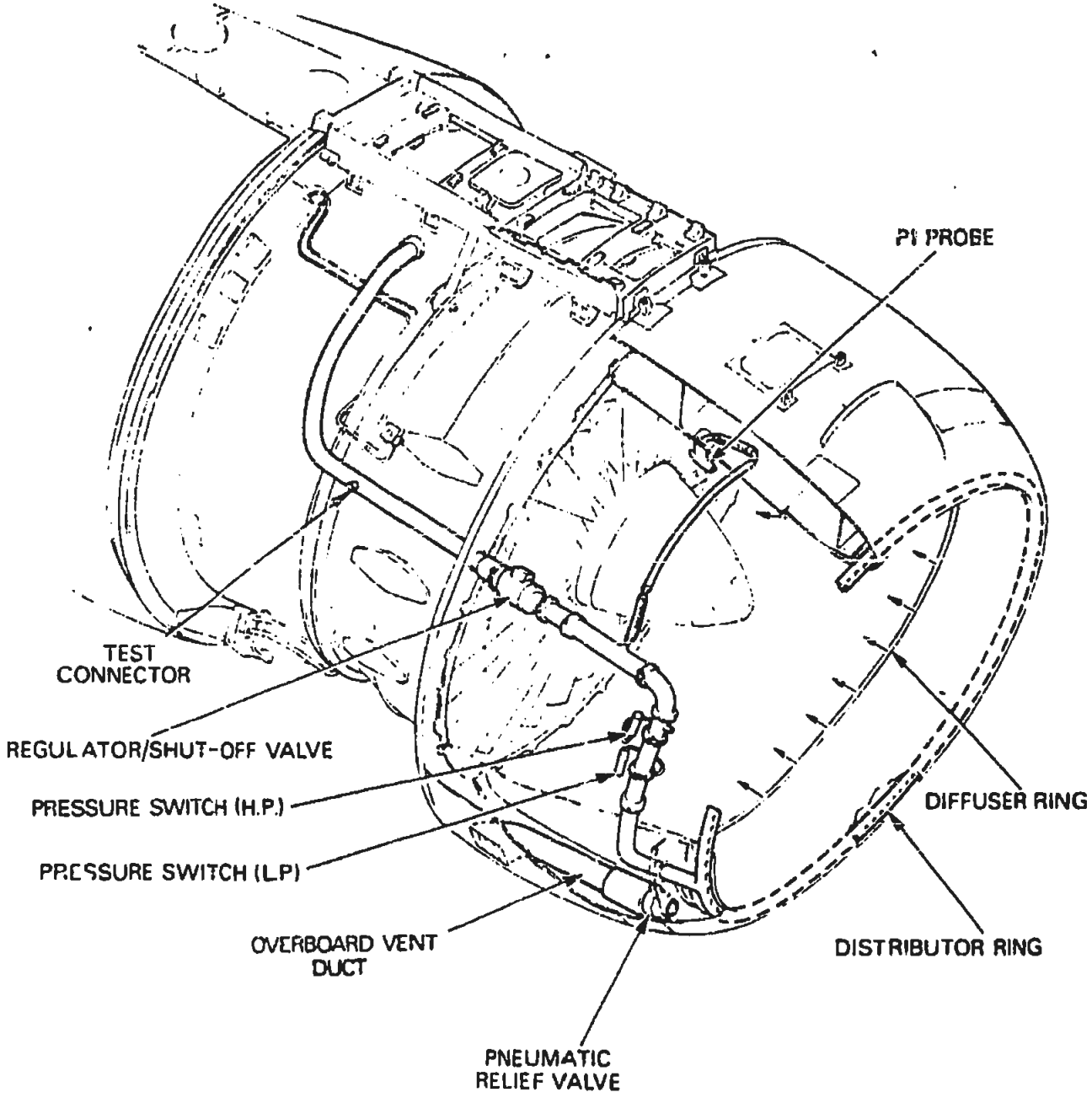
On aircraft 001-027, 030-999 with RR SB30-2178 and 028-029, the pneumatic relief valve is connected, by a duct, to a louvered outlet located on the nose cowl lower skin on Engines No. 1 and 3 (Ref. Fig. 1). The duct is connected to the valve by a short floating sleeve, to allow for expansion and positional tolerances.

6. Pneumatic Relief Valve (Ref. Fig. 5)

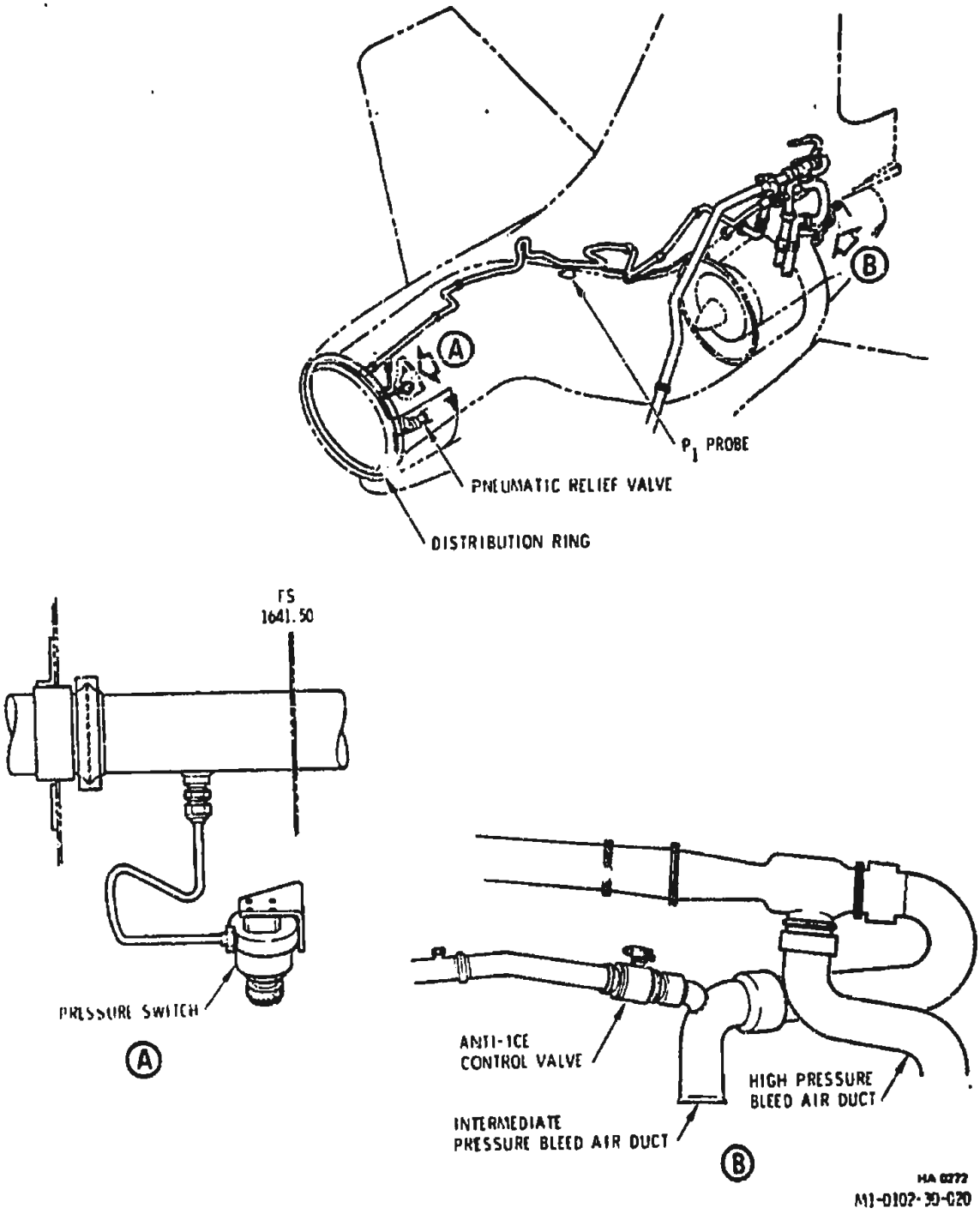
The penumatic relief valve prevents overpressuring of the nose cowl by opening to release pressure when it exceeds 5.5 psig.

The valve is simply a piston inside a cylinder that is held closed by a spring. If pressure exceeds 5.5 psig on the inside wall of the cylinder the force of the spring is less than the force of the air and the piston is pushed open enough to release pressure.

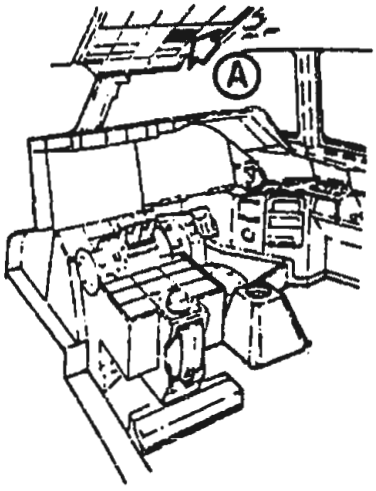
On aircraft 001-027, 030-999 with RR SB30-2178 and 028-029, the air pressure relieved by the valve is vented overboard through a louvered outlet and duct fitted in the nose cowl.

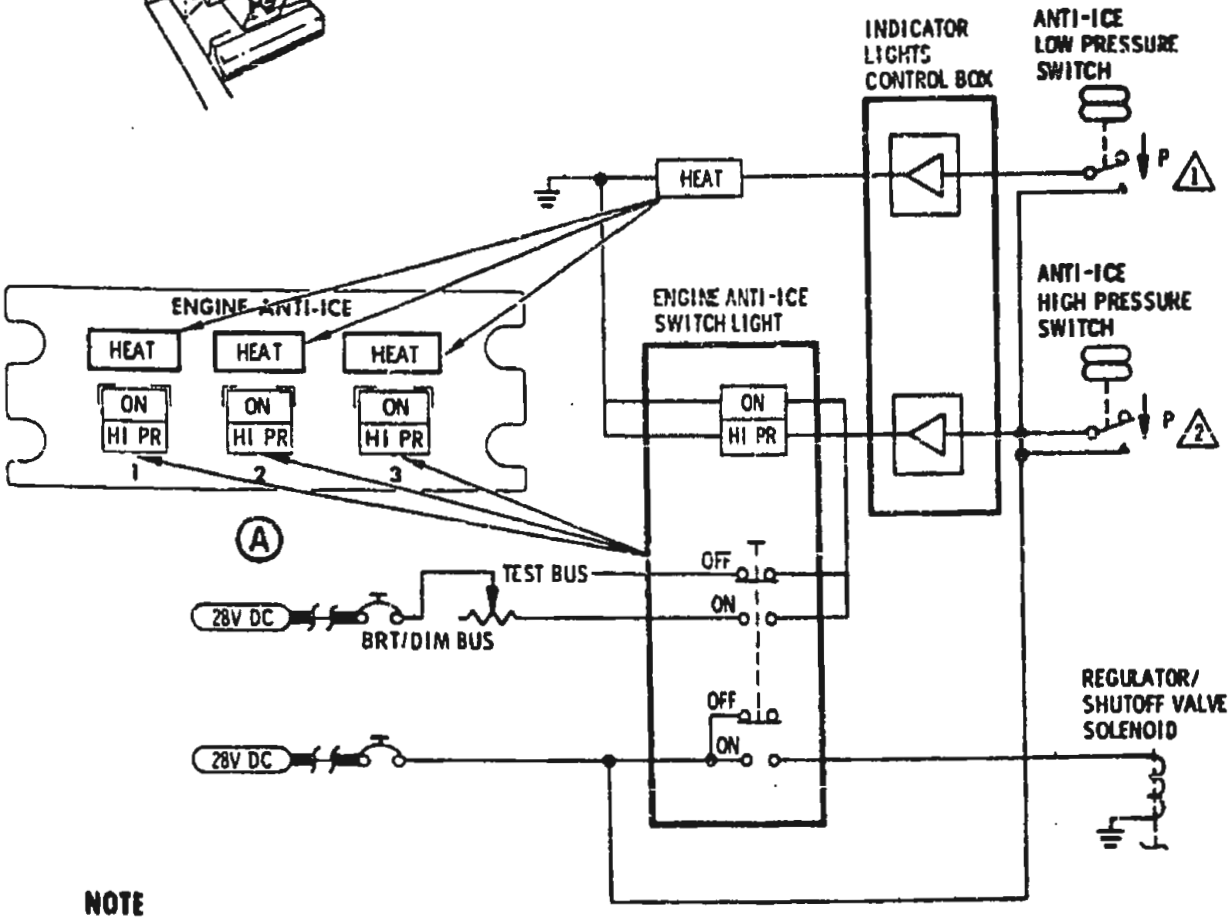


No. 1 and No. 3 Engine Inlet Anti-icing System
Figure 1



No. 2 Engine Inlet Anti-icing System
Figure 2





NOTE

1. CLOSES AT 5 PSIG
2. CLOSES AT 40 PSIG OR GREATER FOR ENGINES 1 AND 3 OR 25 PSIG FOR ENGINE 2.
3. SYSTEM SHOWN IS TYPICAL FOR ALL 3 ENGINES. ONLY CIRCUITS DIRECTLY AFFECTING SYSTEMS ARE SHOWN.

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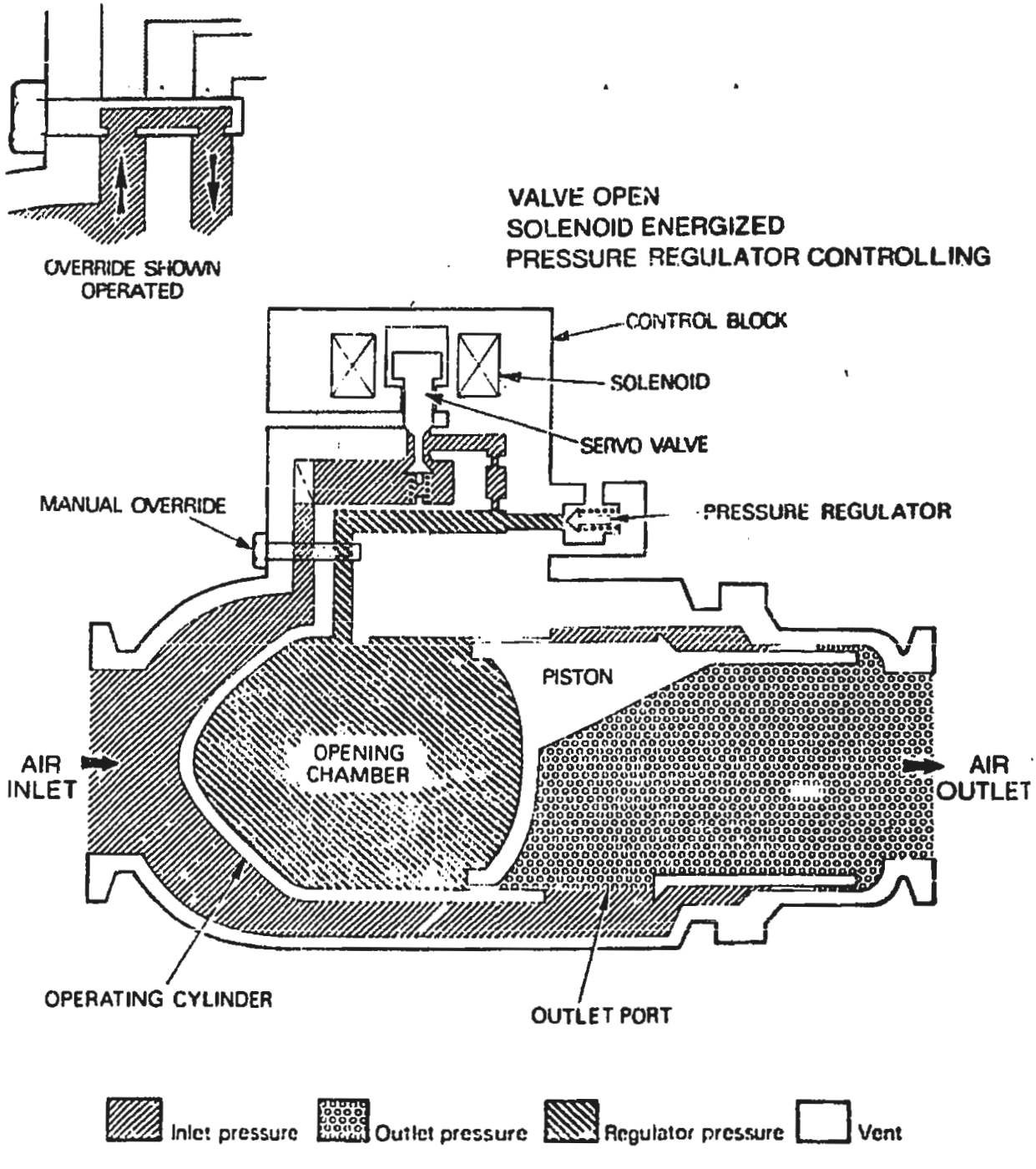
R R Engine Inlet Anti-Icing System Simplified Schematic
Figure 3

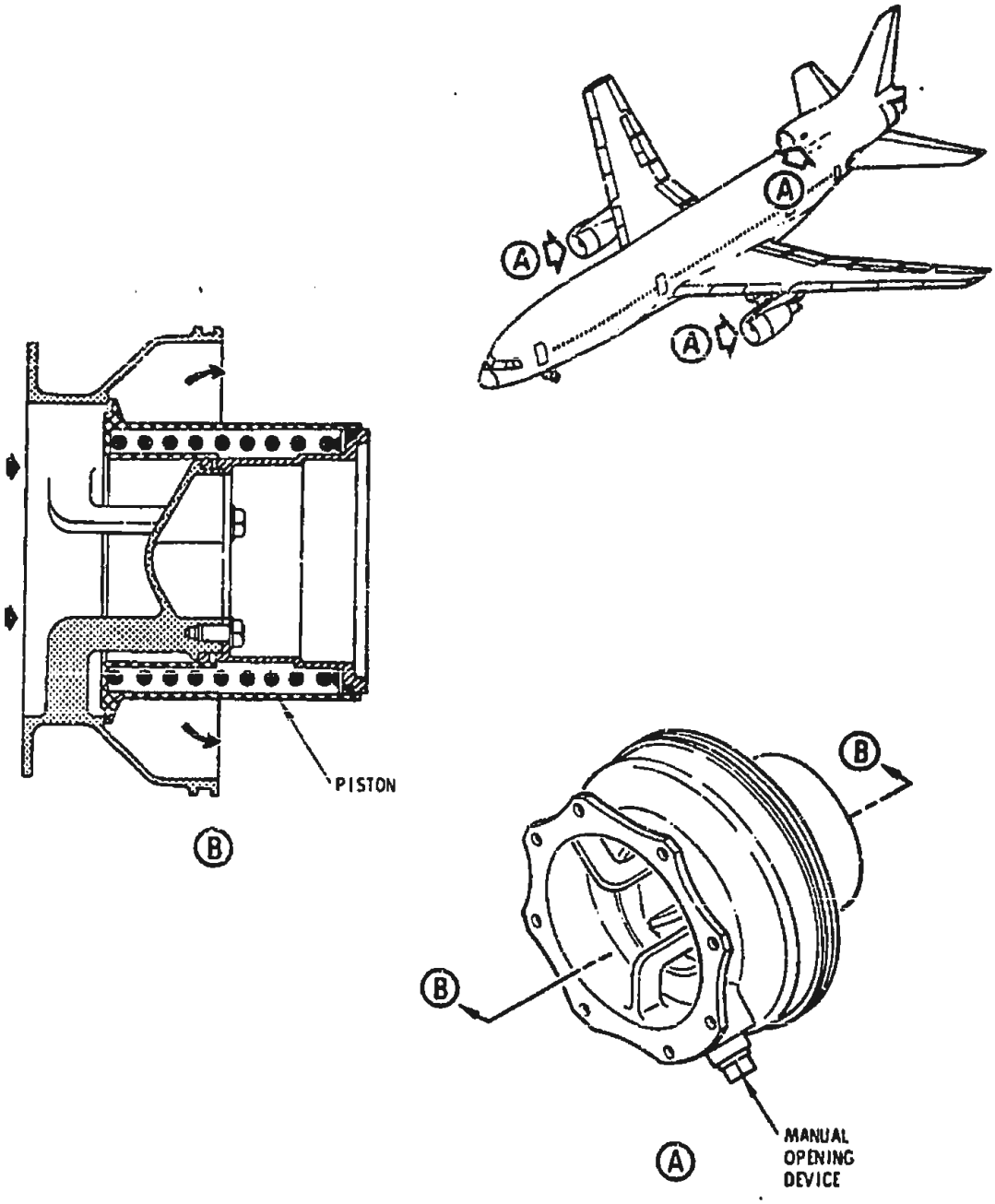


Regulator/Shutoff Valve Operation
Figure 4

R

EFFECTIVITY: ALL

001B



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Pneumatic Relief Valve
Figure 5

ENGINE INLET ANTI-ICING SYSTEM - FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting Engine Inlet Anti-Icing system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel by a FRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is block 1.

PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnect wiring.

2. Supplemental data

Supplementary data includes functional tests, checkout tests, BITE checks and other general information that can be helpful in performing fault isolation. Supplementary data in this section is listed in table 101.

Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Engine Inlet Anti-Icing system. It gives the access/area of each component and its respective removal and installation reference.

Figure 102, Component Locator Diagram, illustrates the locator on the aircraft of all the components listed in the Component Location Index.

Refer to the Maintenance Manual Introduction for a more detailed discussion of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation Identification

Table 101 is a list of fault isolation data in this section of the manual.

Table 101

	FIGURE	TITLE
	101	Component Location Index
R	102	Component Locator Diagram
	103	Engine Anti-ice Fault
	SCHEM 1	Engine Inlet Anti-Ice System Electrical Schematic

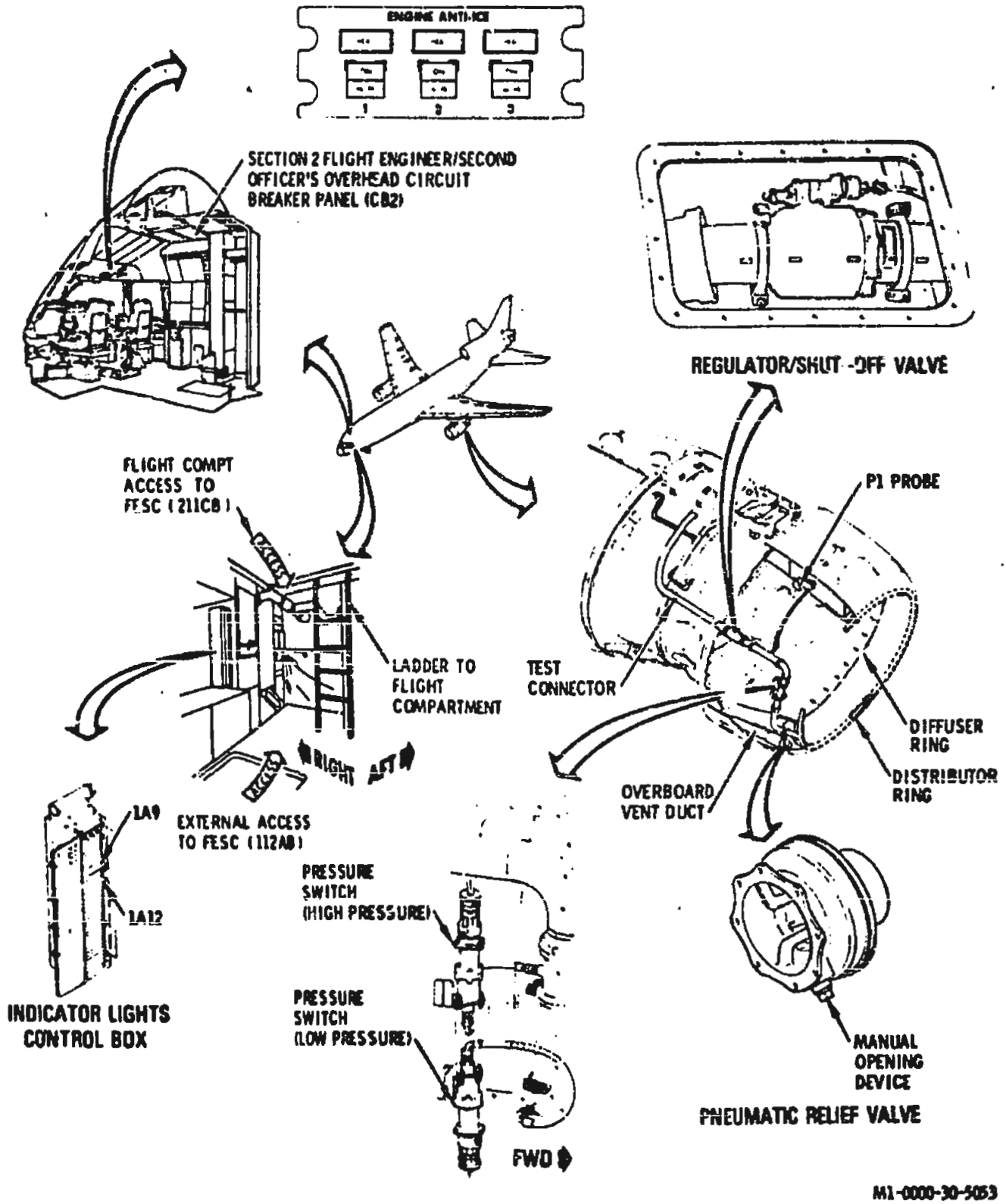
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
ENGINE 1 ANTI-ICE (3021-CB1)	1	FE/SO OVHD CKT BRKR PNL CB2/P10	•
ENGINE 2 ANTI-ICE (3021-CB2)	1	FE/SO OVHD CKT BRKR PNL CB2/P10	•
ENGINE 3 ANTI-ICE (3021-CB3)	1	FE/SO OVHD CKT BRKR PNL CB2/P10	•
CONTROL BOX – INDICATOR LIGHTS (ILCB):			
CARD 1A9	1	FESC/112AB	33-17-04
CARD 1A12	1	FESC/112AB	33-17-04
CONTROL PANEL – ENGINE INLET ANTI-ICE	1	PILOT'S OVHD PNL/P5	30-21-99
SWITCH – DUAL PRESSURE, NO. 2 ENGINE (3021-S2)			
SWITCH – LOW PRESSURE, WING ENGINE	2	NOSE COWL/411DR, 421DR	30-21-13
SWITCH – HIGH PRESSURE, WING ENGINE	2	NOSE COWL/411DR, 421DR	30-21-13
SWITCHLIGHTS:			
ENGINE 1 (3021-DS1)	1	ENGINE ANTI-ICE CONTROL PANEL/P5	30-21-16
ENGINE 2 (3021-DS3)	1	ENGINE ANTI-ICE CONTROL PANEL/P5	30-21-16
ENGINE 3 (3021-DS5)	1	ENGINE ANTI-ICE CONTROL PANEL/P5	30-21-16
VALVE – PNEUMATIC RELIEF, NO. 2 ENGINE	1	S-DUCT, FWD LH/311KL	30-21-23
VALVE – PNEUMATIC RELIEF, WING ENGINE	2	NOSE COWL/ 411HR	30-21-22
VALVE – REGULATOR/SHUTOFF, NO. 2 ENGINE	1	ENG SUPT, STRUCT/471BL	30-21-02
VALVE – REGULATOR/SHUTOFF, WING ENGINE	2	NOSE COWL/411RR, 421RR	30-21-01

*SEE WM EQUIPMENT LIST

M1-0000-30-6088

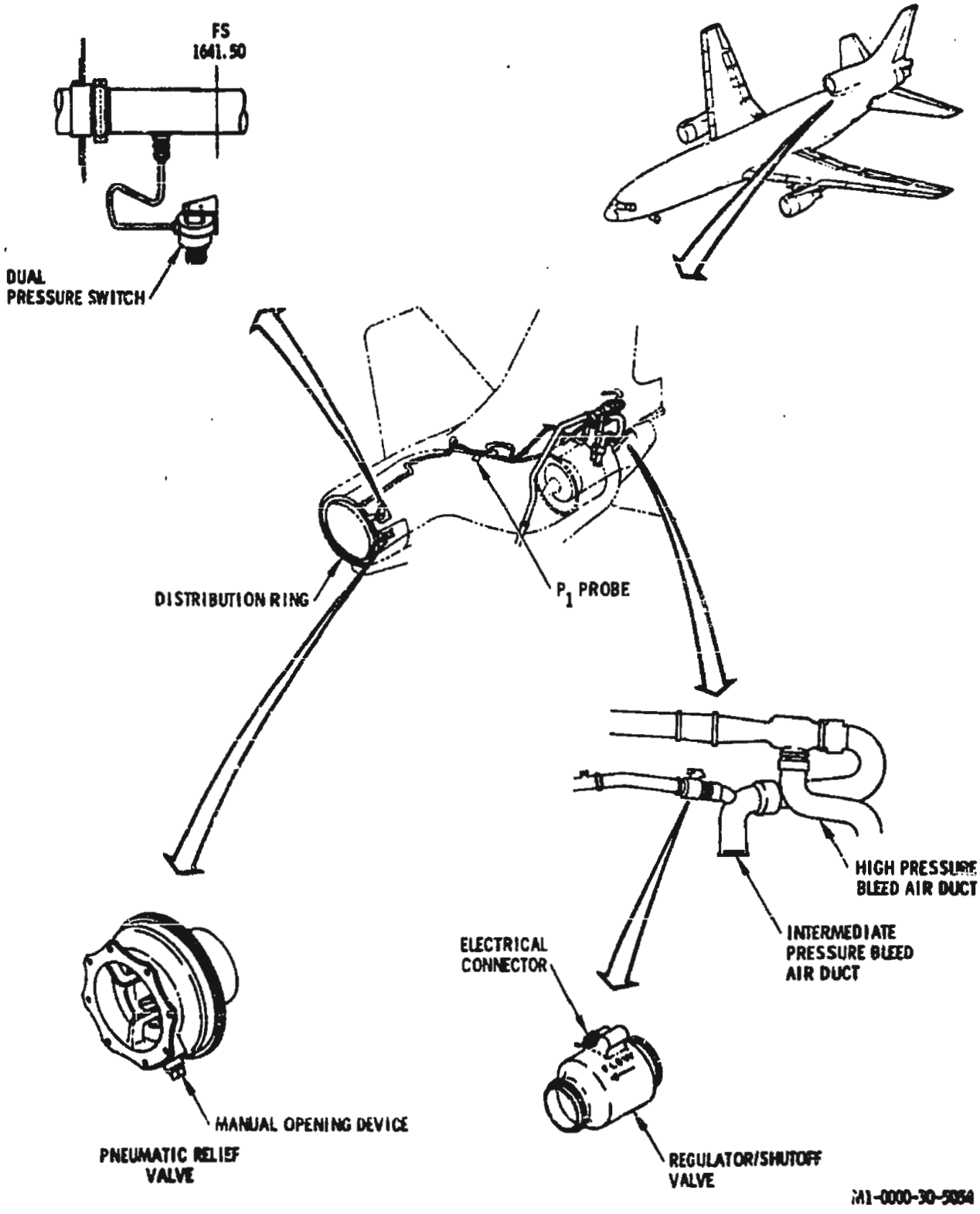
R
R Component Location Index
Figure 101

R EFFECTIVITY: ALL
R
001B



Component Locator Diagram
Figure 102 (Sheet 1)

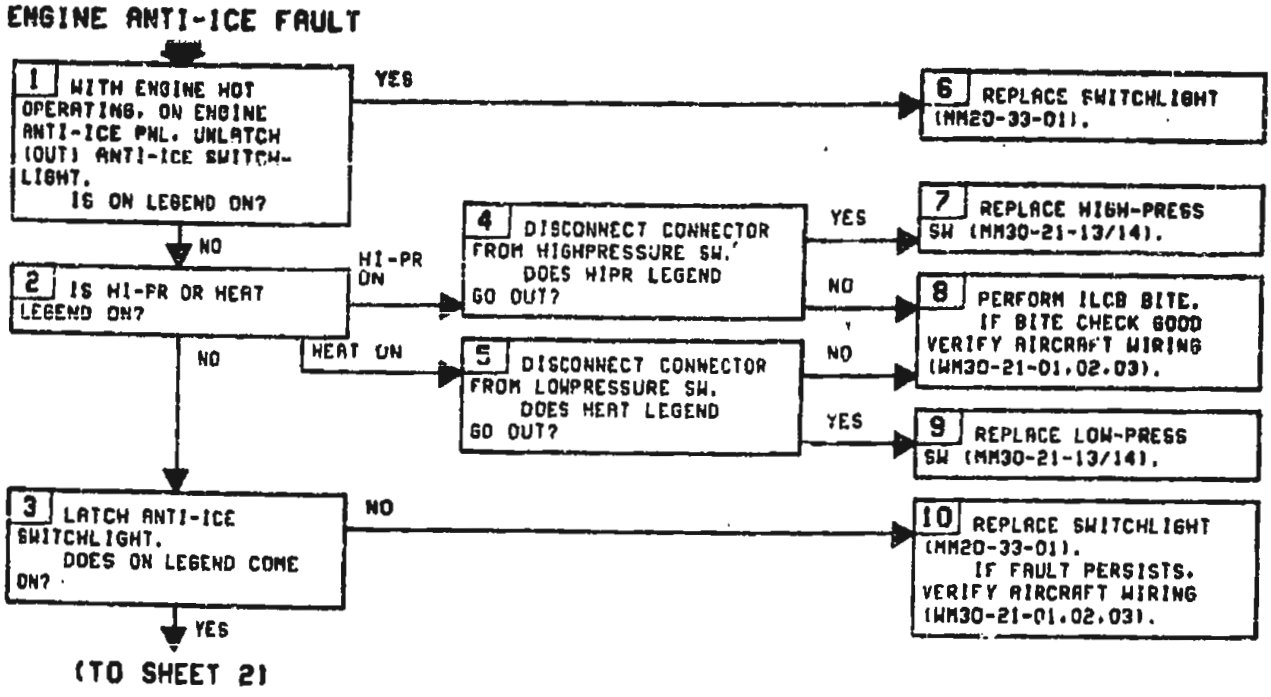
EFFECTIVITY: ALL



R Component Locator Diagram
R Figure 102 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: ENG 1 2D15, 2H10, ILB
ENG 2 2D18, 2J2, 2H8
ENG 3 2D20, 2H9, 2H11.

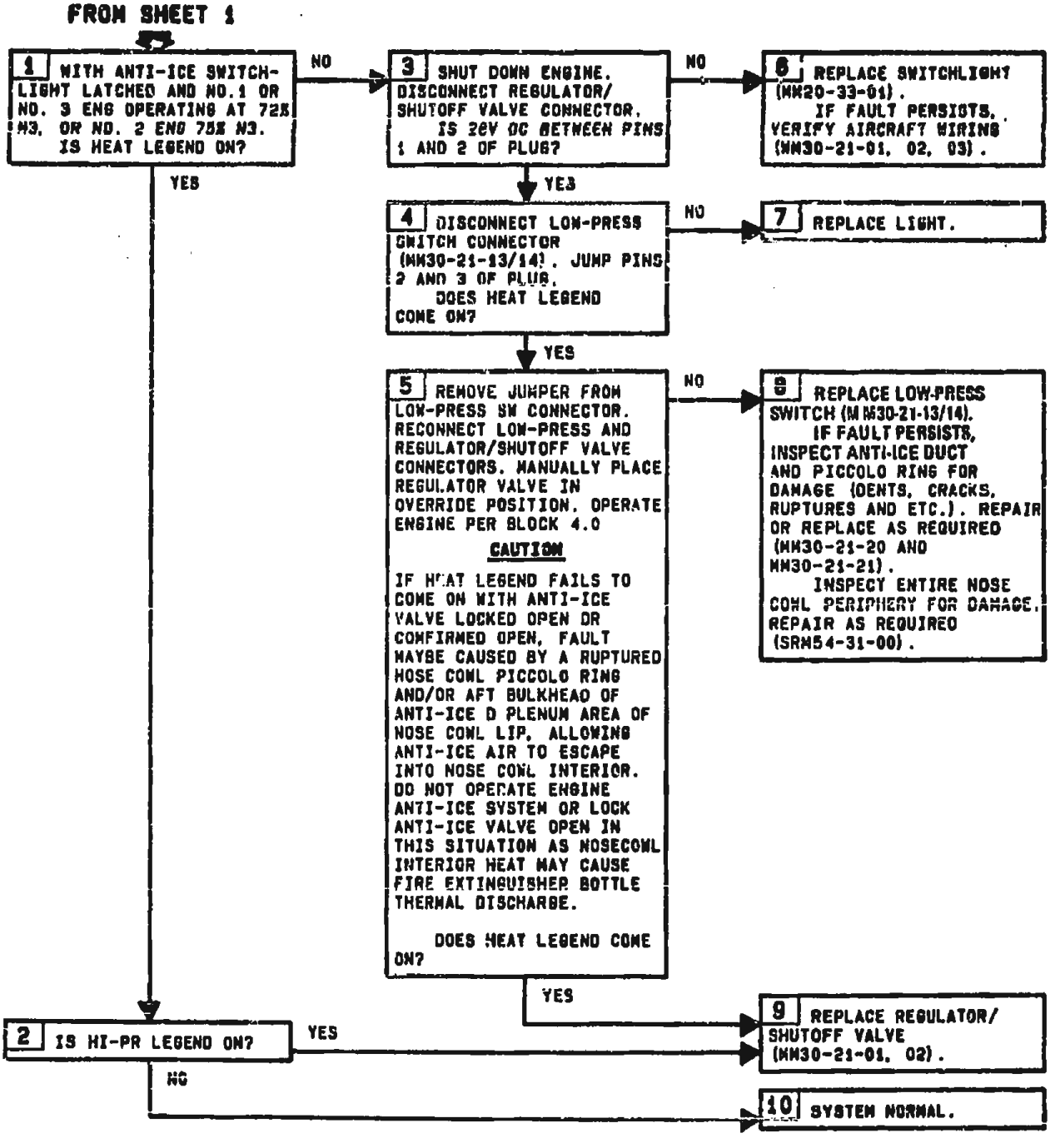

ENGINE ANTI-ICE FAULT
1 WITH ENGINE HOT OPERATING, ON ENGINE ANTI-ICE PNL, UNLATCH (OUT) ANTI-ICE SWITCH-LIGHT. IS ON LEGEND ON?
YES
6 REPLACE SWITCHLIGHT (MM20-33-01).
NO
2 IS HI-PR OR HEAT LEGEND ON?
HI-PR ON
4 DISCONNECT CONNECTOR FROM HIGHPRESSURE SW. DOES HIPR LEGEND GO OUT?
YES
7 REPLACE HIGH-PRESS SW (MM30-21-13/14).
NO
8 PERFORM ILCB BITE. IF BITE CHECK GOOD VERIFY AIRCRAFT WIRING (MM30-21-01,02,03).
HEAT ON
5 DISCONNECT CONNECTOR FROM LOWPRESSURE SW. DOES HEAT LEGEND GO OUT?
NO
YES
9 REPLACE LOW-PRESS SW (MM30-21-13/14).
NO
3 LATCH ANTI-ICE SWITCHLIGHT. DOES ON LEGEND COME ON?
NO
10 REPLACE SWITCHLIGHT (MM20-33-01). IF FAULT PERSISTS, VERIFY AIRCRAFT WIRING (MM30-21-01,02,03).
YES
(TO SHEET 2)

R Engine Anti-ice Fault
R Figure 103 (Sheet 1)

EFFECTIVITY: ALL

001B

PREREQUISITES
SEE SHEET 1


FROM SHEET 1
1 WITH ANTI-ICE SWITCH-LIGHT LATCHED AND NO.1 OR NO. 3 ENG OPERATING AT 72% N3, OR NO. 2 ENG 75% N3. IS HEAT LEGEND ON?
NO
3 SHUT DOWN ENGINE. DISCONNECT REGULATOR/ SHUTOFF VALVE CONNECTOR. IS 26V DC BETWEEN PINS 1 AND 2 OF PLUG?
NO
6 REPLACE SWITCHLIGHT (MM20-33-01). IF FAULT PERSISTS, VERIFY AIRCRAFT WIRING (MM30-21-01, 02, 03).
YES
YES
4 DISCONNECT LOW-PRESS SWITCH CONNECTOR (MM30-21-13/14). JUMP PINS 2 AND 3 OF PLUG. DOES HEAT LEGEND COME ON?
NO
7 REPLACE LIGHT.
YES
5 REMOVE JUMPER FROM LOW-PRESS SW CONNECTOR. RECONNECT LOW-PRESS AND REGULATOR/SHUTOFF VALVE CONNECTORS. MANUALLY PLACE REGULATOR VALVE IN OVERRIDE POSITION. OPERATE ENGINE PER BLOCK 4.0
CAUTION
IF HEAT LEGEND FAILS TO COME ON WITH ANTI-ICE VALVE LOCKED OPEN OR CONFIRMED OPEN, FAULT MAYBE CAUSED BY A RUPTURED NOSE COWL PICCOLO RING AND/OR AFT BULKHEAD OF ANTI-ICE D PLENUM AREA OF NOSE COWL LIP, ALLOWING ANTI-ICE AIR TO ESCAPE INTO NOSE COWL INTERIOR. DO NOT OPERATE ENGINE ANTI-ICE SYSTEM OR LOCK ANTI-ICE VALVE OPEN IN THIS SITUATION AS NOSECOWL INTERIOR HEAT MAY CAUSE FIRE EXTINGUISHER BOTTLE THERMAL DISCHARGE.
DOES HEAT LEGEND COME ON?
NO
8 REPLACE LOW-PRESS SWITCH (MM30-21-13/14). IF FAULT PERSISTS, INSPECT ANTI-ICE DUCT AND PICCOLO RING FOR DAMAGE (DENTS, CRACKS, RUPTURES AND ETC.). REPAIR OR REPLACE AS REQUIRED (MM30-21-20 AND MM30-21-21). INSPECT ENTIRE NOSE COWL PERIPHERY FOR DAMAGE. REPAIR AS REQUIRED (SRM54-31-00).
YES
9 REPLACE REGULATOR/ SHUTOFF VALVE (MM30-21-01, 02).
2 IS HI-PR LEGEND ON?
YES
NO
10 SYSTEM NORMAL.

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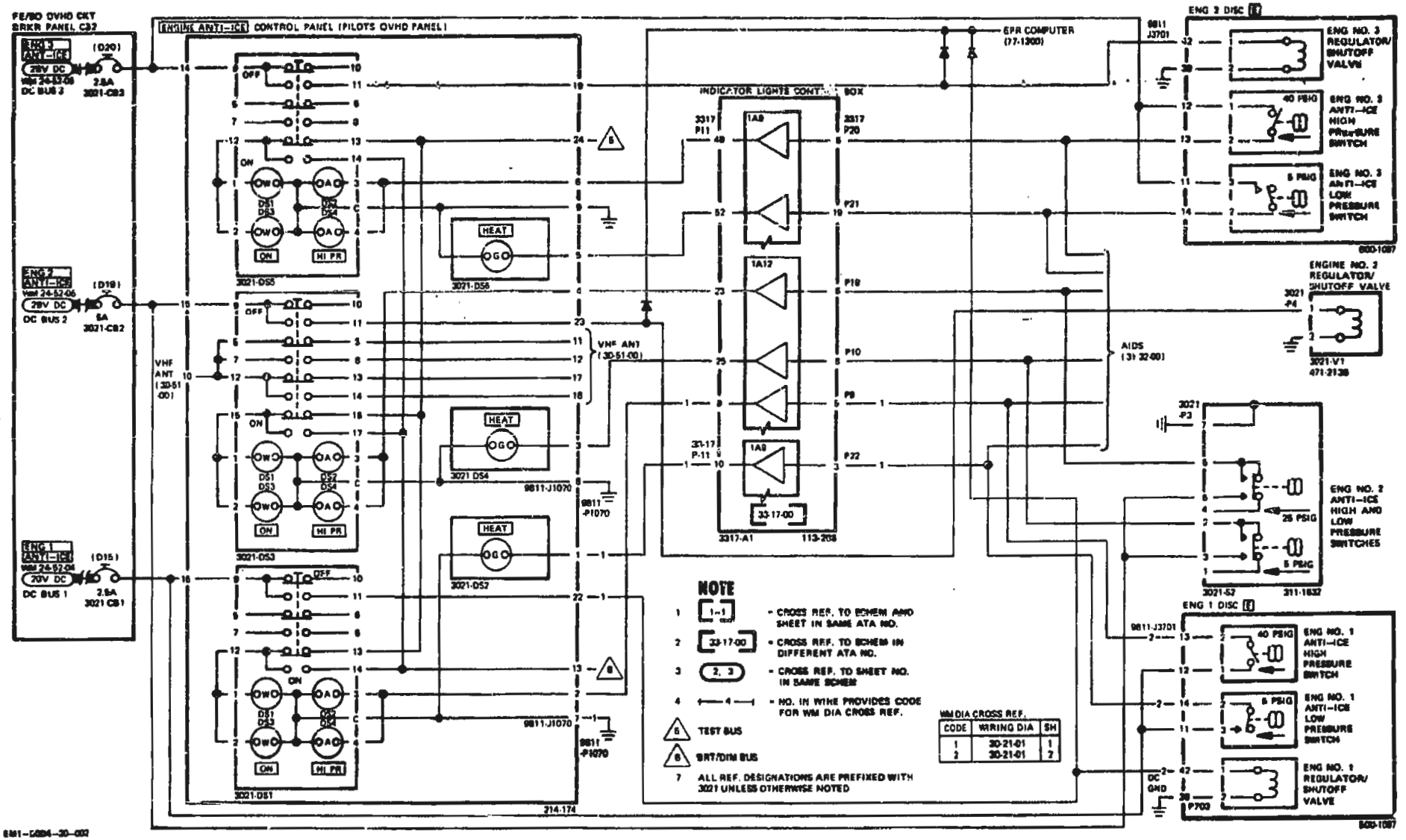
R Engine Anti-Ice Fault
R Figure 103 (Sheet 2)

EFFECTIVITY: ALL

001B


ENGINE ANTI-ICE CONTROL PANEL (PILOTS OVHD PANEL)
INDICATOR LIGHTS CONT... BOX
EPR COMPUTER (77-1300)
ENG 2 DISC
ENG NO. 3 REGULATOR/ SHUTOFF VALVE
ENG NO. 3 ANTI-ICE HIGH PRESSURE SWITCH
ENG NO. 3 ANTI-ICE LOW PRESSURE SWITCH
ENGINE NO. 2 REGULATOR/ SHUTOFF VALVE
ENG NO. 2 ANTI-ICE HIGH AND LOW PRESSURE SWITCHES
ENG 1 DISC
ENG NO. 1 ANTI-ICE HIGH PRESSURE SWITCH
ENG NO. 1 ANTI-ICE LOW PRESSURE SWITCH
ENG NO. 1 REGULATOR/ SHUTOFF VALVE
AIDS (31-32-00)
VHF ANT (30-51-00)
NOTE
WM DIA CROSS REF.
TEST BUS
BRT/DIM BUS
ALL REF. DESIGNATIONS ARE PREFIXED WITH 3021 UNLESS OTHERWISE NOTED

Engine Inlet Anti-ice System Electrical Schematic
SCHEM 1

R EFFECTIVITY: ALL
R
001B

ENGINE INLET ANTI-ICE SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
80-11-00	Engine Starting System - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-41-00).

(2) Operate engines (Ref. 80-11-00).

(3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that the following circuit breakers are closed:

ANTI-ICE - ENG 1 - ANTI-ICE (D15)

ANTI-ICE - ENG - ANTI-ICE - 2 (D19)

ANTI-ICE - ENG - ANTI-ICE - 3 (D20)

(4) On Pilots Overhead LIGHTS panel, depress TEST switchlight, and verify that all indicator lights on ENGINE ANTI-ICE panel come on.

(5) Advance power lever for engine being checked to attain 72 percent N_3 for engines No. 1 and No. 3, or 75 percent N_3 for engine No. 2.

R CAUTION: IF HEAT LEGEND DOES NOT COME ON, THE ENGINE
R REGULATOR/SHUT OFF VALVE MUST BE DEACTIVATED
R CLOSED IN ACCORDANCE WITH MEL PROCEDURES.

(6) Actuate each ON/HI PR alternate-action switchlight on ENGINE ANTI-ICE panel and verify the following:

R (a) ON legend comes on.

R (b) HEAT legend comes on.

R (c) HI PR legend remains off.

CR CR (7) Actuate each switchlight to turn off engine anti-ice and verify the following:

CR (a) ON legend goes off.

CR (b) HEAT legend goes off.

CR (c) HI PR legend remains off.

(8) Shut down engines (Ref. 80-11-00).

(9) Turn off electrical power (Ref. 24-41-00).

ENGINE REGULATOR/SHUTOFF VALVE MAINTENANCE PRACTICES

1. Equipment and Materials

Protective caps

2. Referenced Procedure

30-21-22 Engine Pneumatic Relief Valve - Adjustment and Test

3. Maintenance Practices

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

A. Deactivation of Regulator/Shutoff Valve (Open Position)

(1) On ANTI-ICE section of Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag applicable circuit breaker:

ENG 1 - ANTI-ICE (D15)

ENG - ANTI-ICE - 2 (D19)

ENG - ANTI-ICE - 3 (D20)

WARNING: RECENT OPERATION OF SYSTEM WILL CAUSE HIGH TEMPERATURES. PRECAUTIONS SHOULD BE TAKEN TO PREVENT INJURY.

(2) Perform pneumatic relief valve test (Ref. 30-21-22).

(3) After acceptable test of pneumatic relief valve, remove applicable access panel:

Engine No. 1 - 411RR

R Engine No. 2 - 471BL

Engine No. 3 - 421RR

(4) Disconnect electrical connector from shutoff valve. Install protective caps on both halves of connector. Secure plug to protect against vibration.

(5) Remove cotter pin from spring-loaded lock.

R (6) Fully depress and hold spring-loaded lock.

R CAUTION: ENSURE MANUAL OVERRIDE CONTROL SWITCH
R SPRING-LOADED LOCK IS PUSHED FULLY IN (DISENGAGED)
R BEFORE THE MANUAL OVERRIDE CONTROL IS SET TO
R OVERRIDE. FAILURE TO FULLY DEPRESS THE
R SPRING-LOADED LOCK CAN CAUSE DAMAGE TO THE
R OVERRIDE SELECTOR CONTROL CONE WHEN THE MANUAL
R OVERRIDE CONTROL IS OPERATED.

(7) Rotate manual override control to OVERRIDE position.

NOTE: Slot in right end of override control hex indicates position of valve.

(8) Release spring-loaded lock and verify that left end of lock seats in control hex detent.

(9) Do not fit a split pin to spring loaded lock.

C (10) Replace access panel.

(11) On pilots overhead control panel, zone 210, placard applicable ENG ANTI-ICE switchlight CONTROL VALVE DEACTIVATED OPEN.

(12) Make appropriate entry in aircraft log book.

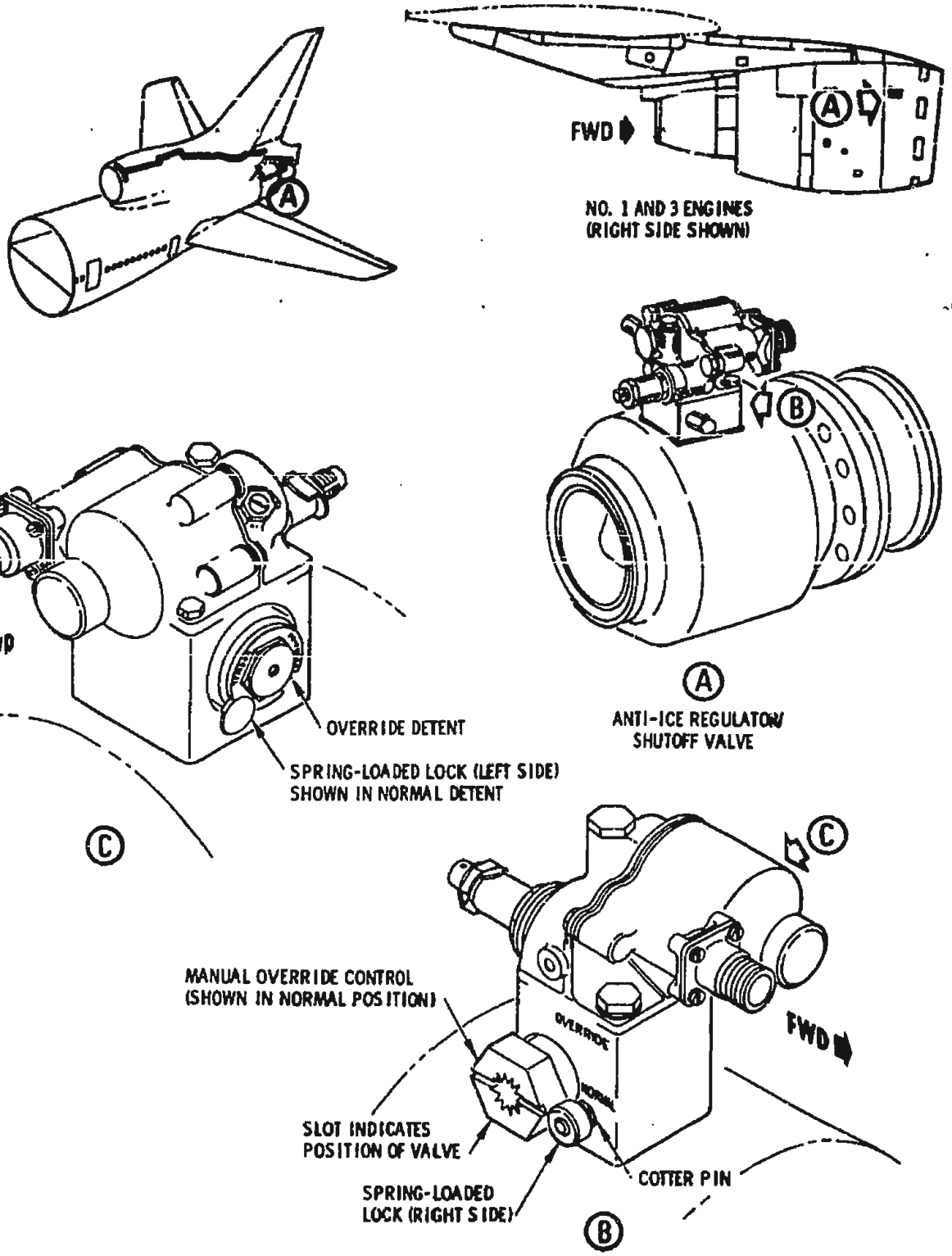
(13) Remove tag and close circuit breaker opened in Step 3A(1).

B. Deactivation of Regulator/Shutoff Valve (Closed Position)

(1) On ANTI-ICE section of Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and collar applicable circuit breaker ENG 1 - ANTI-IE (D15) ENG - ANTI-ICE - 2 (D19), or ENG - ANTI-ICE - 3 (D20).

(2) On pilots overhead control panel, zone 210, placard applicable ENG ANTI-ICE switchlight CONTROL VALVE DEACTIVATED CLOSED.

(3) Make appropriate entry in aircraft log book.



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R Regulator/Shutoff Valve Manual Operation
R Figure 201

ENGINE NO. 1 AND ENGINE NO. 3 REGULATOR/SHUTOFF VALVE REMOVAL AND INSTALLATION

1. Equipment and Materials

Seal Extractor Tool, Avica-Flex, AVT. 2821, or equivalent

Protective caps

2. Referenced Procedures

20-36-02	Double T-Bolt V-Band Coupling - Removal and Installation
30-21-00	Engine Inlet Anti-ice System - Adjustment and Test
71-00-00	Power Plant - Adjustment and Test

3. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ENG 1 - ANTI-ICE (engine No. 1) (D15) or ENG - 3 (engine No. 3) (D20).

R WARNING: DO NOT PRESSURIZE INTERMEDIATE PRESSURE BLEED AIR DUCT WITH REGULATOR/SHUTOFF VALVE REMOVED.

TAG FLIGHT ENGINEER/SECOND OFFICERS ENGINE BLEED CONTROL PANEL, APU CONTROL PANEL, AND THREE HIGH-PRESSURE GROUND AIR CONNECTIONS.

RECENT OPERATION OF SYSTEM WILL CAUSE HIGH TEMPERATURES. WEAR PROTECTIVE GLOVES IF NECESSARY.

(2) Remove access panel 411RR (engine No. 1) or 421RR (engine No. 3).

(3) Disconnect electrical connector from valve (Ref. Fig. 401). Install protective cap.

(4) Remove coupling clamp (Ref. 20-36-02) at each end of valve.

(5) Manually move anti-ice duct forward and remove valve. Install protective caps on valve and duct openings.

(6) Use seal extractor tool to remove E-seal (Ref. 20-36-02) from valve inlet. Retain seal.

B. Installation

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Verify that tags installed in WARNING are in place.

(3) Remove protective caps from valve and duct openings.

(4) Fit and check E-seal in valve inlet and check E-seal in forward anti-ice duct flange (Ref. 20-36-02).

(5) Prepare clamps and mating flanges for installation (Ref. 20-36-02).

(6) Place valve between duct flanges. Verify that flow arrow points forward and yellow flashes on ducts and valve align.

(7) Secure valve to ducts with clamps (Ref. 20-36-02).

(8) Remove protective cap and connect electrical connector.

(9) Install access panel.

R (10) Remove tag and close circuit breaker opened in Step 3A(1).

R (11) Perform Engine Anti-ice System check to verify operation of Engine No. 1 and 3 regulator/shutoff valve (Ref. 30-21-00).

C C. Operate Affected Engine (Ref. 80-11-00)

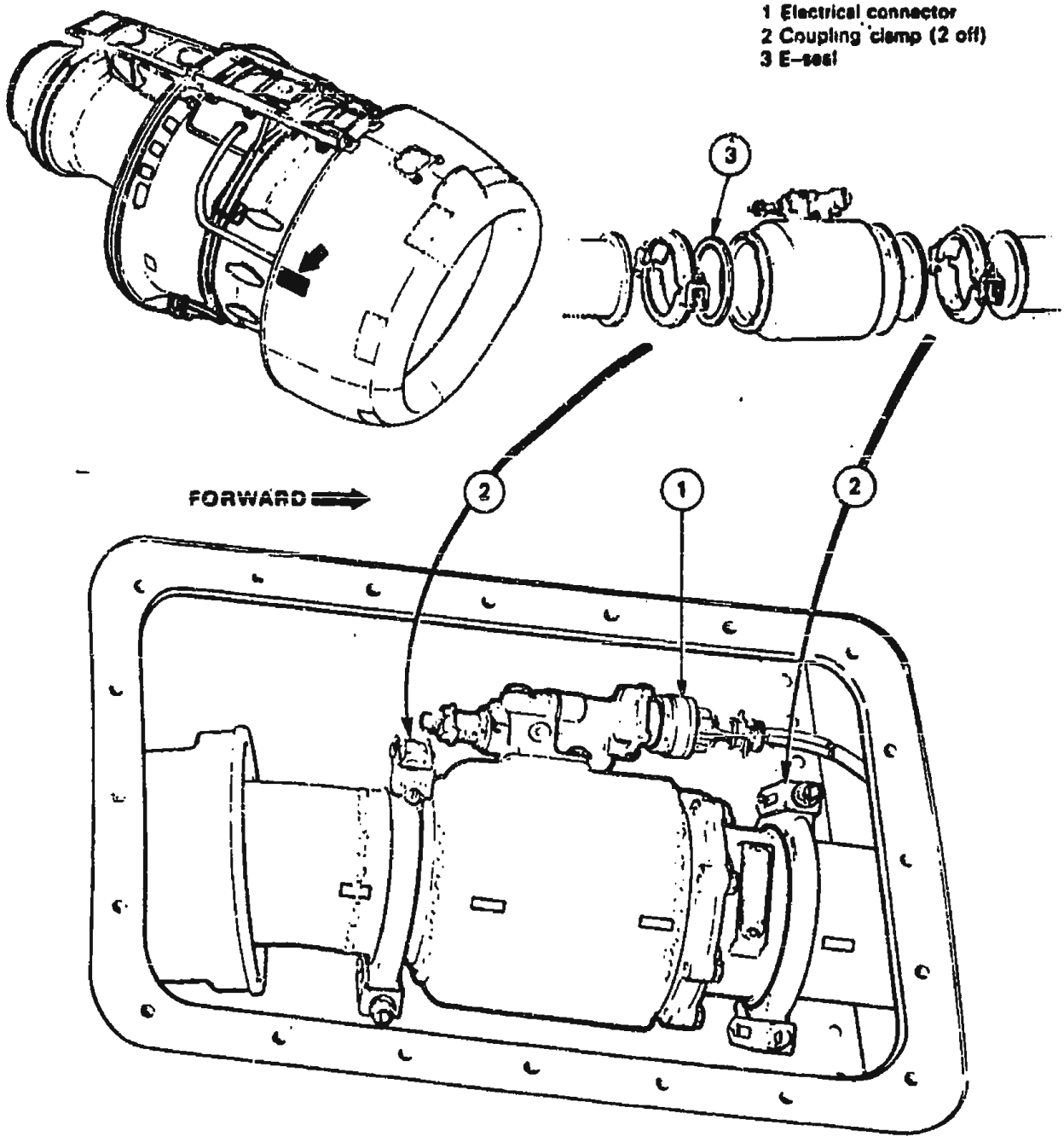
C (1) On Flight Engineer/Second Officers overhead circuit
C breaker panel CB2, zone 215, verify that the associated
C circuit breaker is closed:

C ANTI-ICE - ENG 1 - ANTI-ICE (D15)

C ANTI-ICE - ENG - ANTI-ICE - 2 (D19)

C ANTI-ICE - ENG - ANTI-ICE - 3 (D20)

C (2) On Pilots Overhead LIGHTS panel, depress TEST
C switchlight, and verify that all indicator lights on



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Regulator/Shutoff Valve - Removal and Installation
Figure 401

C ENGINE ANTI-ICE panel come on. Release test switch
C light.

C (3) Advance power lever for engine being checked to attain
C 72 percent N3 for engines No. 1 and No. 3, or 75
C percent N3 for engine No. 2.

C (4) Verify that the HEAT LIGHT comes ON.

C D. Shut Down Engine (Ref. 80-11-00)

C (1) If HEAT LIGHT does not illuminate the engine thermal
C anti-ice valve MUST be in closed position prior to
C dispatch.

ENGINE NO. 2 REGULATOR/SHUTOFF VALVE REMOVAL AND INSTALLATION

1. Equipment and Materials

Protective caps

2. Referenced Procedures

20-36-02 Double T-bolt V-band Coupling - Removal and Installation

30-21-00 Engine No. 2 Anti-ice System - Adjustment and Test

3. Removal/Installation

A. Removal

WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT SYSTEM OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - ENG 2 (D19).

CR (2) Remove access panel 471BL (on left side).

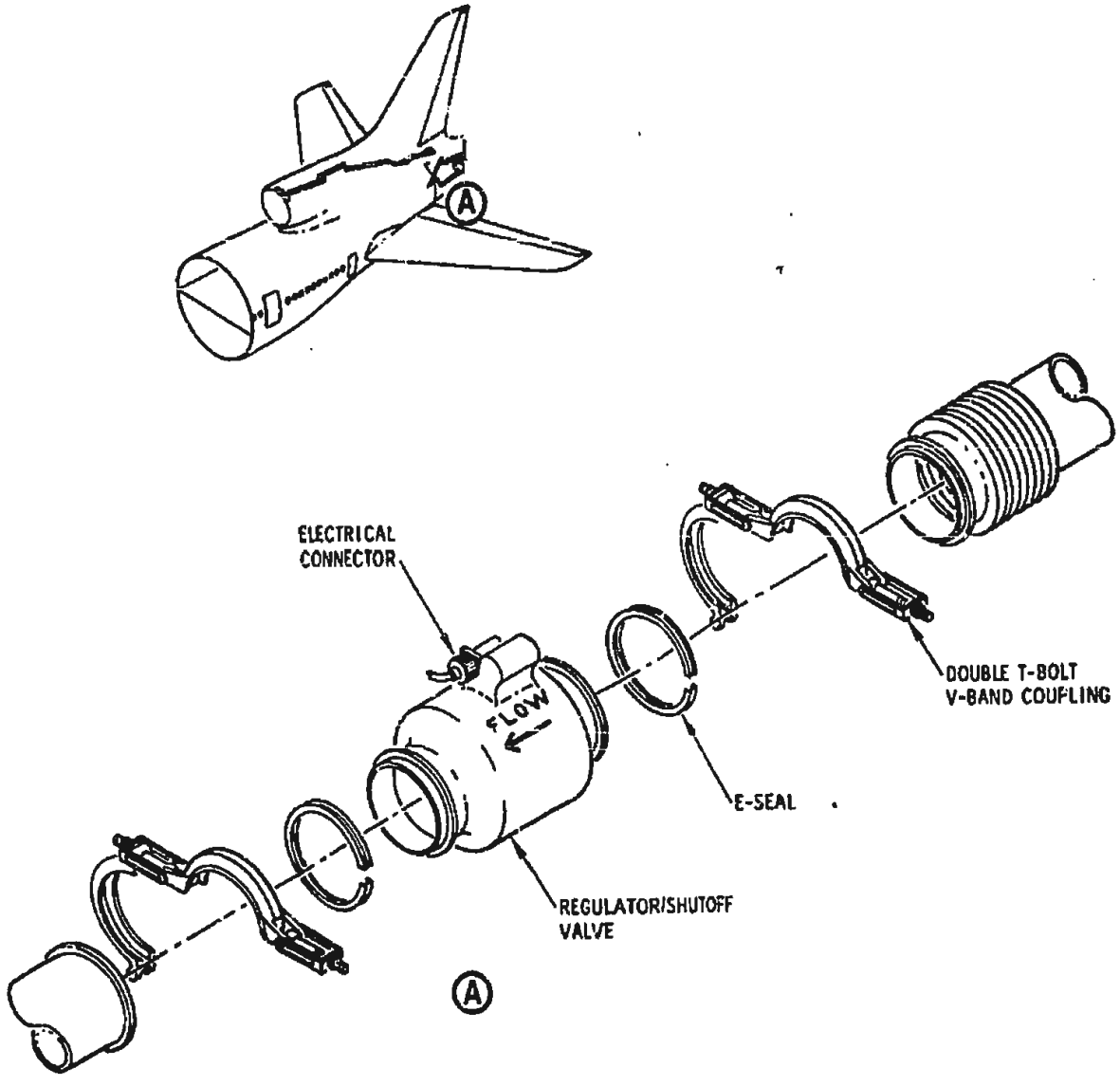
(3) Disconnect electrical connector from regulator/shutoff valve (Ref. Fig. 401).

(4) Remove T-bolt clamp (Ref. 20-36-02) and E-seal attaching each end of valve to duct.

(5) Remove valve and install protective caps over anti-ice duct openings.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.



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R Engine No. 2 Regulator/Shutoff Valve - Removal and Installation
R Figure 401

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Remove protective caps from anti-ice duct openings.

(3) Place valve to position between ducts, with flow arrow pointing forward.

(4) Connect valve to ducts with E-seals and T-bolt clamps (Ref. 20-36-02).

(5) Connect electrical connector to valve.

(6) Remove tags installed at beginning of Paragraph 3.

(7) Remove tag and close circuit breaker opened in Step 3A(1).

R R (8) Perform Engine Anti-ice System Check to verify engine No. 2 regulator/shut-off valve (Ref. 30-21-00).

(9) Install access panel.

CR CR C. Operate Affected Engine (Ref. 30-21-01, Regulator/Shut-Off Valve Removal/Installation, Paragraph C.).

ENGINE NO. 1 AND 3 PRESSURE SWITCHES REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is identical for the high- and low-pressure switches in engines No. 1 and 3 (Ref. Fig. 401). The only differences are the affected circuit breakers and access panels.

2. Equipment and Materials

Protective caps

Seal (Ref. Fig. 401)

Lock-wire, stainless steel, 21 AWG, or equivalent

3. Referenced Procedure

30-21-00 Engine Inlet Anti-ice System - Adjustment and Test

4. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ENG 1 - ANTI ICE (D15) or ENG 3, - ANTI-ICE - (D20) as applicable.

(2) Remove access panel 411DR or 421DR, as applicable.

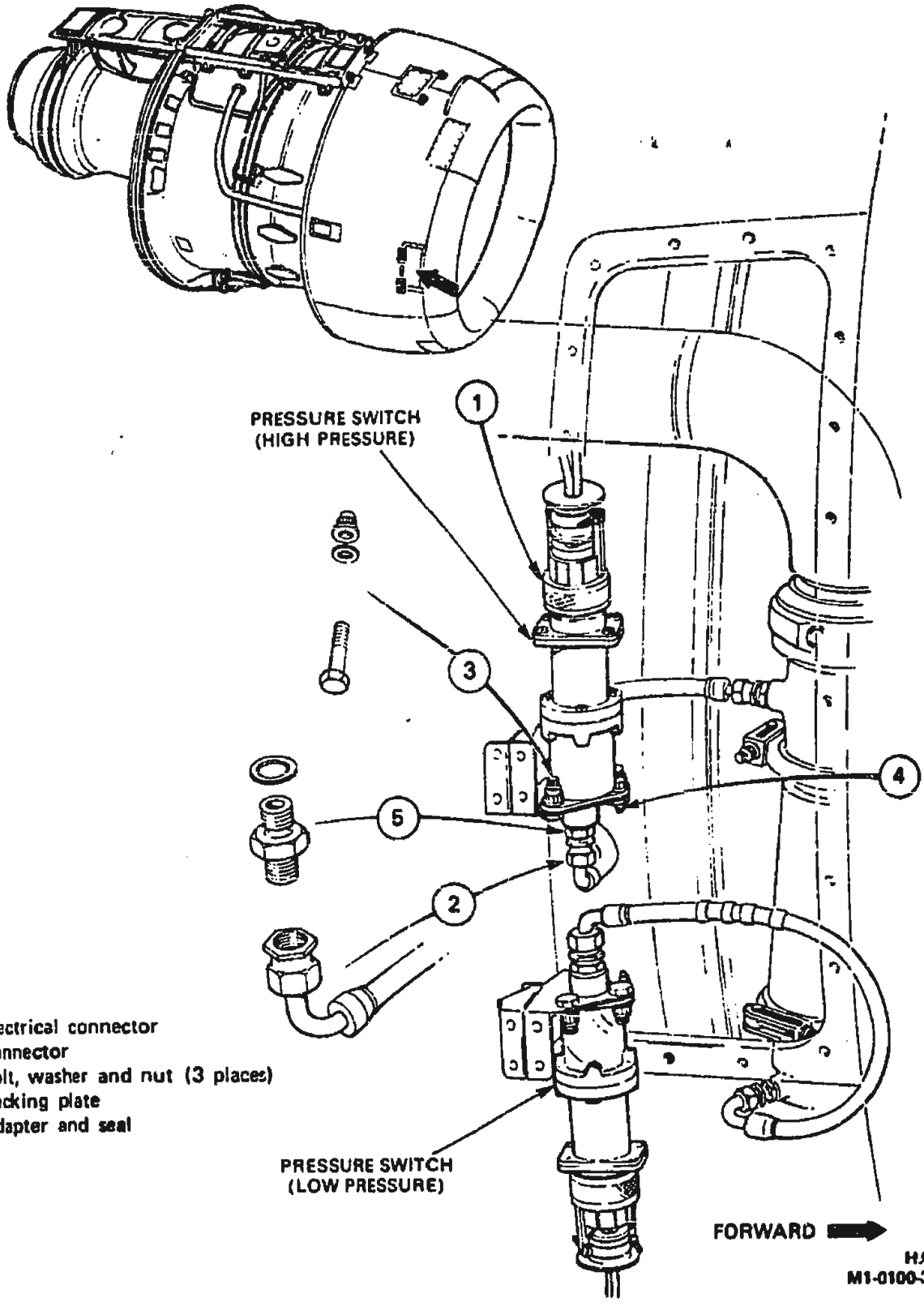
(3) Remove electrical connector from pressure switch.

(4) Remove connector from pressure switch.

(5) Place protective caps on all connectors.

(6) On aircraft without RR SB71-4119, remove bolts, washers, nuts, and locking plate, and remove switch from nose cowl.

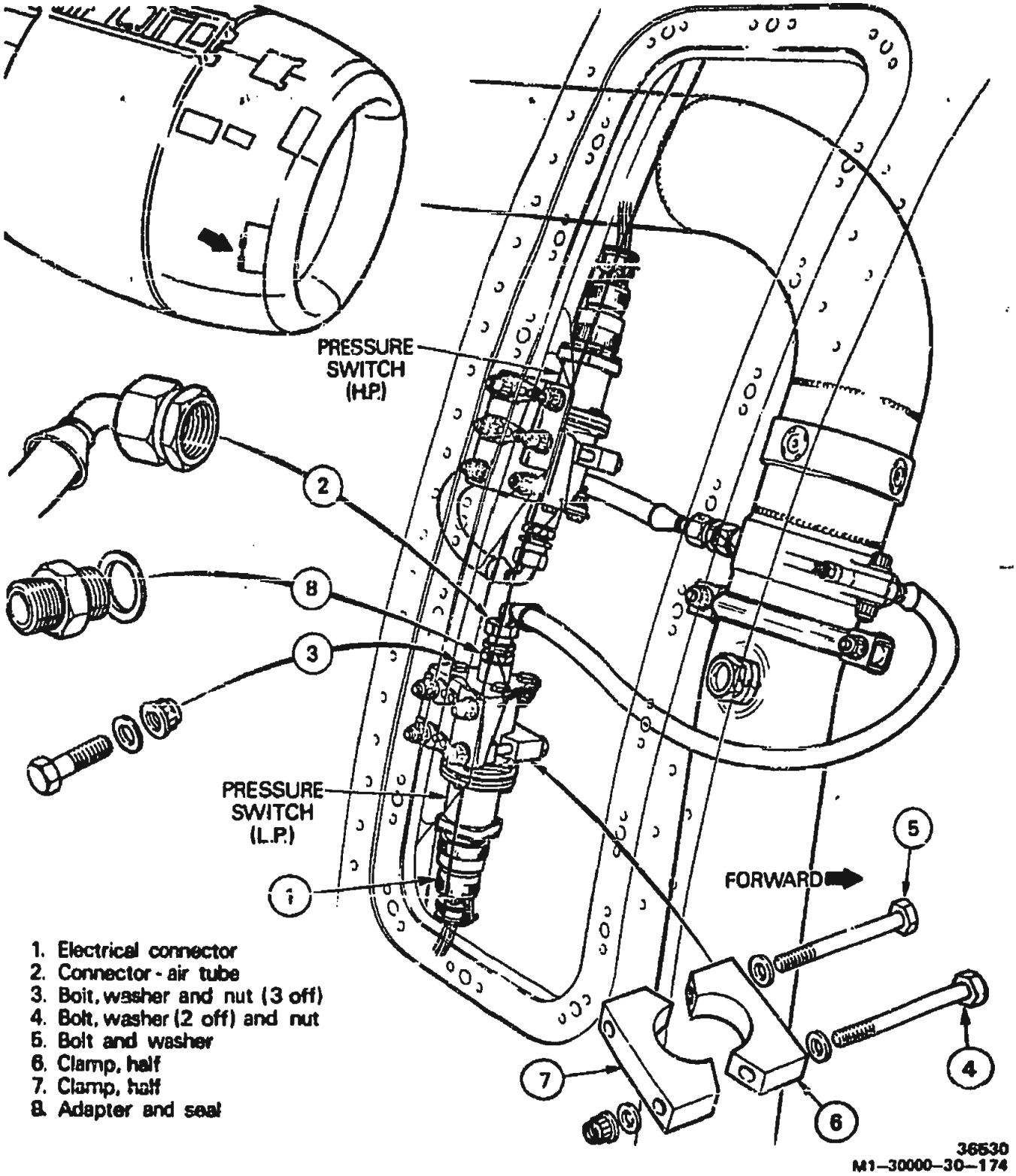
(6) On aircraft with RR SB71-4119, remove bolts, washers, nuts, and clamp bolts, washers, and nuts. Remove clamp halves and switch from nose cowl.



1. Electrical connector
2. Connector
3. Bolt, washer and nut (3 places)
4. Locking plate
5. Adapter and seal

R Engine No. 1 and 3 Pressure Switches
R Removal and Installation
R Figure 401

R EFFECTIVITY: WITHOUT RR SB71-4119



R Engine No. 1 and 3 Pressure Switches
R Removal and Installation
R Figure 401

R EFFECTIVITY: AIRCRAFT WITH RR SB71-4119

R

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(7) Remove adapter and seal. Retain adapter for reinstallation.

B. Installation

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) Remove protective caps from all connectors.

(3) Install adapter and new seal (Ref.

(4) On aircraft without RR SB71-4119, place switch on mounting bracket and secure with bolts, washers, nuts and locking plate. Locking plate is installed under one bolt head.

(4) On aircraft with RR SB71-4119, place switch and clamp halves on mounting bracket, secure with bolts, washers, nuts and clamp halves bolts, washers, and nuts.

(5) Connect and tighten connector to adapter and lock-wire.

(6) Connect and secure electrical connector.

(7) Remove tag and close circuit breaker opened in Step 4A(1).

R (8) Perform Engine Anti-ice System check to verify engine
R No. 1 and 3 pressure switch operation (Ref. 30-21-00).

(9) Install access panel.

ENGINE NO. 2 PRESSURE SWITCH - REMOVAL AND INSTALLATION

1. General

The engine No. 2 pressure switch is located in the center engine fixed inlet assembly, zone 311. Access is through the top left access panel 311RL.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-3-390, 0.032-inch diameter, or equivalent

3. Referenced Procedure

30-21-00 Engine No. 2 Anti-ice System - Adjustment and Test

4. Removal/Installation

A. Removal

R WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS BLEED AIR AND
R APU CONTROL PANELS AND THE THREE HIGH-PRESSURE
R GROUND AIR CONNECTIONS TO PREVENT SYSTEM OPERATION
R UNTIL COMPLETION OF PROCEDURES.

R RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL
R REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH
R TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED
R WHEN REQUIRED.

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - ENG 2 (D19).

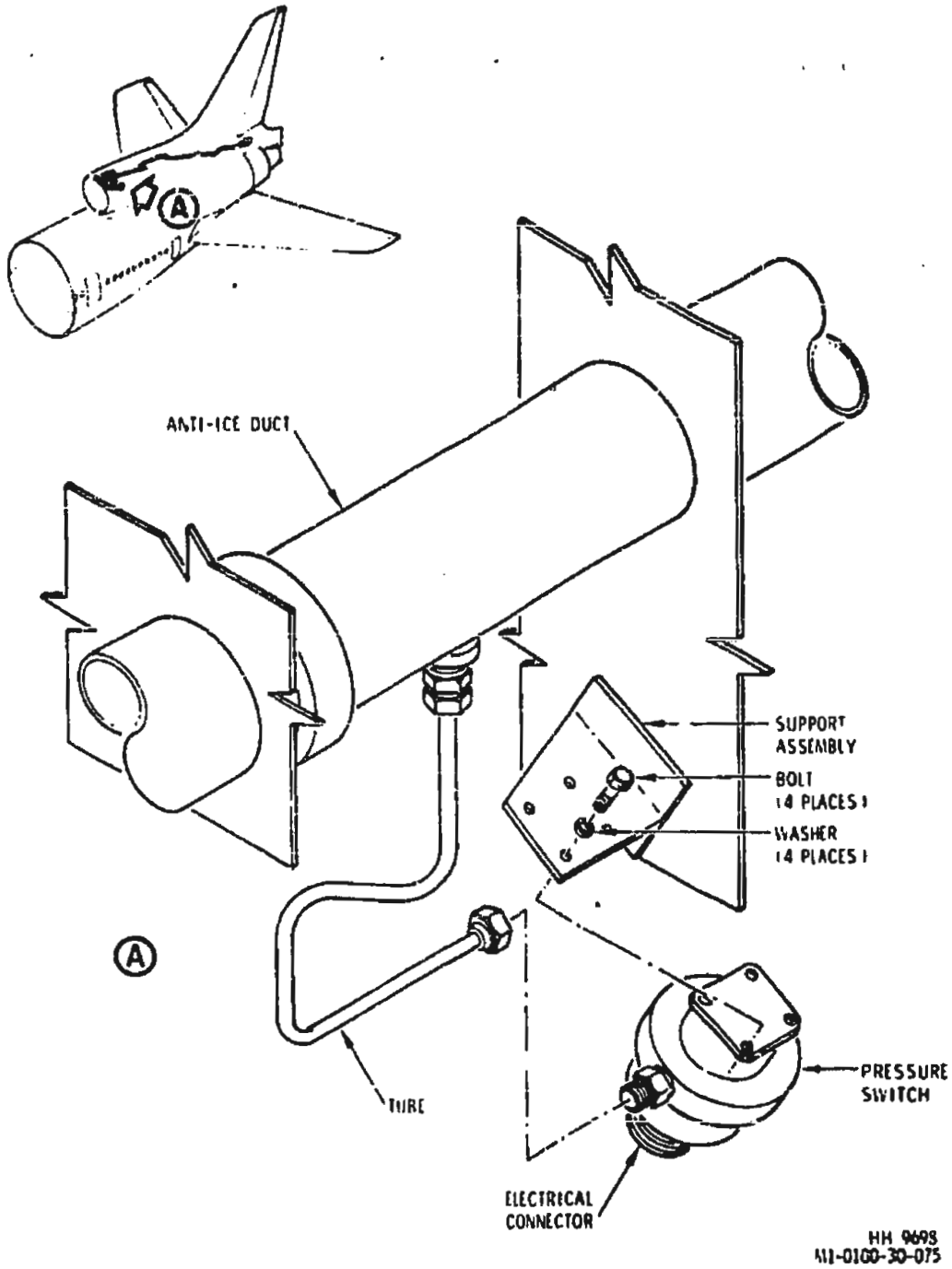
(2) Remove access panel 311RL.

(3) Disconnect electrical connector from pressure switch (Ref. Fig. 401).

(4) Disconnect anti-ice tube from pressure switch.

(5) Remove hardware attaching switch to support assembly.

B. Installation



R
R Engine No. 2 Pressure Switch - Removal and Installation
Figure 401

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) Attach pressure switch to support assembly with attaching hardware and lock-wire bolts.

(3) Connect anti-ice tube to switch.

(4) Connect electrical connector to switch.

(5) Remove tags installed at beginning of Paragraph 4.

(6) Remove tag and close circuit breaker opened in Step 4A(1).

R (7) PerformEngine Anti-ice System Check to verify engine
R No. 2 pressure switch operation (Ref. 30-21-00).

(8) Install access panel.

ENGINES NO. 1 AND NO. 3 AIR DUCTING - INSPECTION AND CHECK

1. Inspection/Check

A. Inspection

(1) Open right-hand hinged cowl 414A or 424A for engines No. 1 and 3.

(2) Inspect air duct between engine/aircraft interface disconnect and nose cowl rear diaphragm for cracks, dents, scoring, nicks, frettage and fouling.

(3) Inspect V-clamps and duct joints for security and condition.

(4) Inspect duct support assemblies for security and condition.

(5) Close right-hand hinged cowl 414A or 424A for engines No. 1 and 3.

B. Acceptance Standards

Cracks in any area of duct and dents within one diameter of duct end fittings are not acceptable.

Damage within following limitations is acceptable:

(1) Smooth dents of large area relative to depth, which do not reduce diameter of duct by more than one-tenth (10%) at any one point.

Smooth dents of small area up to 0.125 sq. in. (8,065 sq. mm.) provided they are round bottomed and their depth does not exceed 0.025 in. (0,635 mm.). Where indentation is in outer surface of a bend, maximum depth must not exceed 0.015 in. (0,381 mm.).

(2) Nicks that are round bottomed and do not exceed 0.004 in. (0,102 mm.) in depth, provided all burrs are removed.

(3) Fretting, on straight sections of duct surface to a depth of 0.010 in. (0,254 mm.) and on outer surfaces of duct bends to a depth of 0.007 in. (0,179 mm.).

(4) Light scoring can be blended out provided not more than 0.005 in. (0,127 mm.) of metal is removed.

ENGINES NO. 1 AND NO. 3 NOSE COWL MOUNTED AIR DUCTING INSPECTION AND CHECK

1. Inspection/Check

A. Inspection

To facilitate inspection of some areas inside nose cowl it will be necessary to use an optical instrument with a flexible probe/viewing head and object illumination.

(1) Remove access panels 411RR, 411DR, 411FR, 411HR, 411BR, 411QL, 411PL, 411ML, 411KL, 411CZ, 411EZ, 411GZ, 411JZ, 411LZ and 411NZ for engine No. 1 and 421RR, 421DR, 421FR, 421HR, 421BR, 421QL, 421PL, 421ML, 421KL, 421CZ, 421EZ, 421GZ, 421JZ, 421LZ and 421NZ for engine No. 3.

(2) Inspect air ducts between nose cowl rear and front diaphragms for cracks, dents, scoring, nicks, frettage and fouling.

(3) Inspect V-clamps and duct joints for security and condition.

(4) Inspect duct support assembly for security and condition.

(5) Inspect seal assembly at nose cowl rear diaphragm for security and condition.

(6) Inspect distributor ring and support assemblies in nose cowl forward compartment for security and condition.

(7) Inspect flexible and rigid anti-icing tubes to P1 probe for damage and security.

(8) Inspect flexible tubes to pressure switches for damage and security.

(9) Fit access panels 411NZ, 411LZ, 411JZ, 411GZ, 411EZ, 411CZ, 411KL, 411ML, 411PL, 411QL, 411BR, 411HR, 411FR, 411DR and 411RR for engine No. 1 and 421NZ, 421LZ, 421JZ, 421GZ, 421EZ, 421CZ, 421KL, 421ML, 421PL, 421QL, 421BR, 421HR, 421FR, 421DR and 421RR for engine No. 3.

B. Acceptance Standards

Cracks in any area of ducts or tubes and dents within one diameter or 0.500 in. (12,70 mm.) of duct or tube end fittings, whichever is greater, are not acceptable.

Damage within following limitations is acceptable:

(1) Smooth dents of large area relative to depth, which do not reduce diameter of tube or duct by more than one tenth (10%) at any one point.

Smooth dents of small area up to 0.125 sq. in. (8,065 sq. mm.) provided they are round bottomed and their depth does not exceed 0.025 in. (0,635 mm.). Where indentation is in outer surface of a bend, maximum depth must not exceed 0.015 in. (0,381 mm.).

(2) Nicks that are round bottomed and do not exceed 0.004 in. (0,102 mm.) in depth, provided all burrs are removed.

(3) Fretting, on straight sections of duct or tube surface to a depth of 0.010 in. (0,254 mm.) and on outer surfaces of duct or tube bends to a depth of 0.007 in. (0,179 mm.).

(4) Light scoring can be blended out provided not more than 0.005 in. (0,127 mm.) of metal is removed.

ENGINES NO. 1 AND NO. 3 PNEUMATIC RELIEF VALVE REMOVAL AND INSTALLATION

1. Equipment and Materials

Silicone grease, Dow Corning DC4 (British DEF. STAN. 59-10), or equivalent

2. Removal/Installation

A. Removal

(1) Remove access panel 411HR for engine No. 1 or 421HR for engine No. 3.

R (2) RB211-22B engines not incorporating RR SB30-2178, Introduction of overboard vent duct:

(a) Remove bolts and washers (Ref. Fig. 401).

(b) Remove valve from nose cowl.

(3) RB.211-22B engines incorporating SB30-2178, and RB.211-524 engines, Introduction of Overboard Vent Duct:

(a) Remove retaining strap (Ref. Fig. 401).

(b) Remove remaining bolts and washers from valve.

(c) Slide reducer duct forward.

(d) Remove valve and reducer duct from nose cowl.

B. Installation

R NOTE: Minor fretting and wear of the lever bore is
R acceptable provided the manual actuation function is
R not impaired.

R Without disassembly, clean the lever shaft and bore
R areas with solvent to remove loose dirt and soot
R accumulation.

R While depressing the lever shaft inward toward the
R center of the valve, apply RTV 731 (28-C0-152)
R compound to the exposed shaft and bore surfaces.

R Build up RTV compound heavily around the inner end

R (Ref. Fig. 402).

R Allow compound to cure per manufacturer's
R instructions.

(1) RB211-22B engines not incorporating SB30-2178:

(a) Locate valve on anti-icing duct and ensure that bolt holes in valve and duct are correctly aligned.

(b) Secure valve with bolts and washers.

R (2) RB.211-22B engines incorporating RR SB30-2178, and RB.211-524 engines:

(a) Fit new seal rings to reducer duct and to relief valve. Lubricate seal rings.

R NOTE: Minor fretting and wear of the lever bore
R is acceptable provided the manual actuation
R function is not impaired.

R Without disassembly, clean the lever shaft
R and bore areas with solvent to remove loose
R dirt and soot accumulation.

R While depressing the lever shaft inward
R toward the center of the valve, apply RTV
R 731 (28-C0-152) compound to the exposed
R shaft and bore surfaces.

R Build up RTV compound heavily around the
R inner end (Ref. Fig. 402).

R Allow compound to cure per manufacturer's
R instructions.

(b) Fit reducer duct to relief valve.

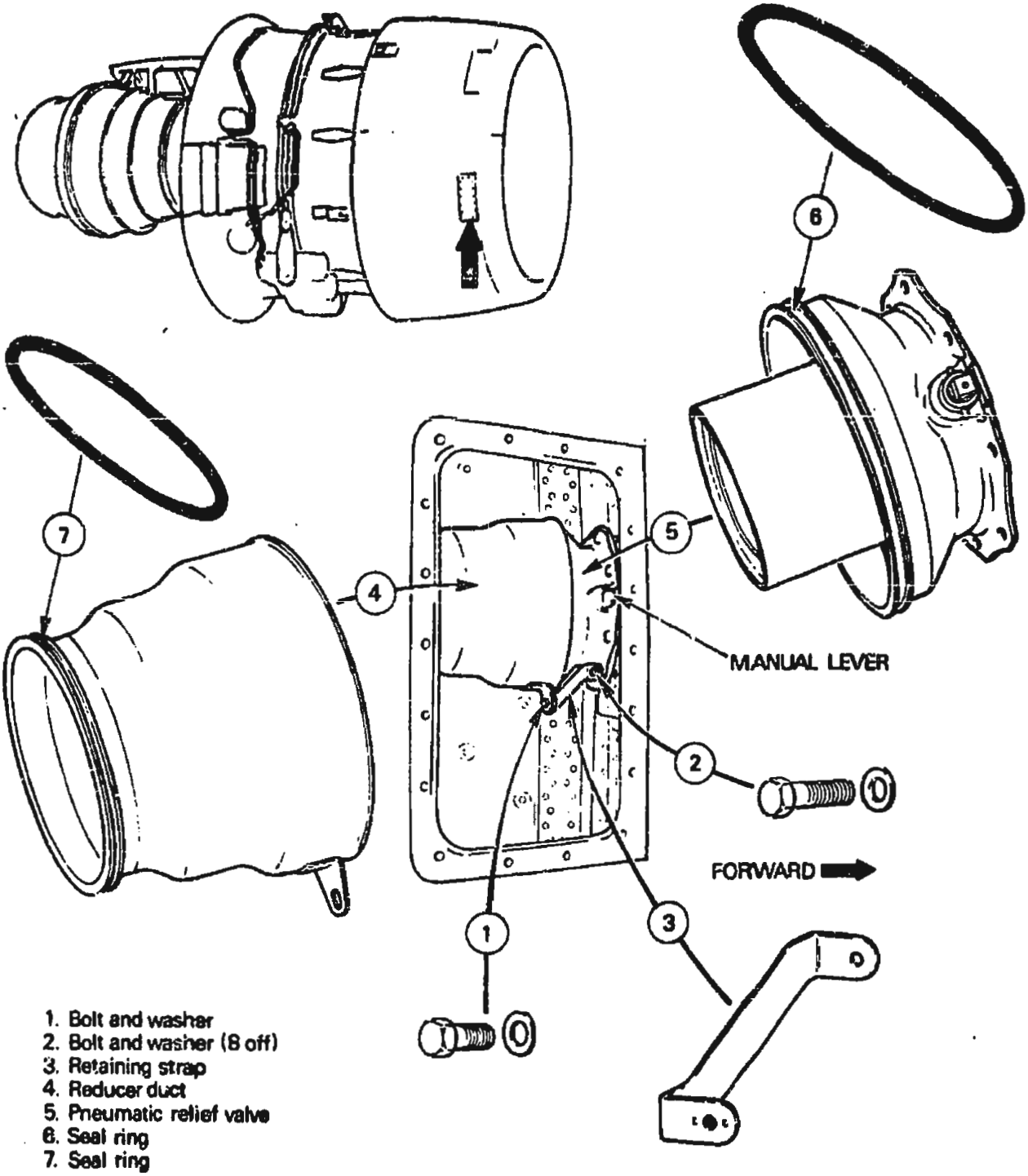
(c) Locate valve on anti-icing duct, and ensure that bolt holes in valve and duct are correctly aligned.

(d) Slide reducer duct rearward, and locate in overboard duct.

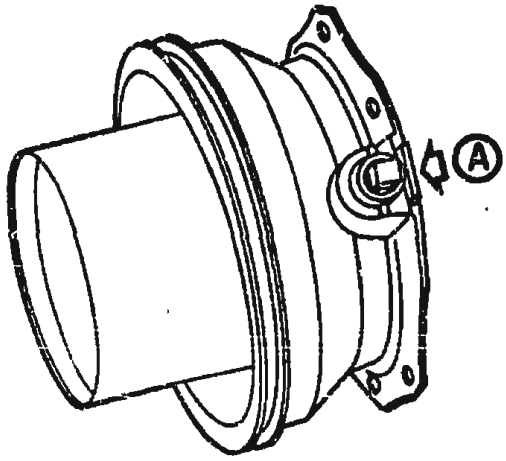
(e) Secure valve with bolts and washers and attach retaining strap under bolt.

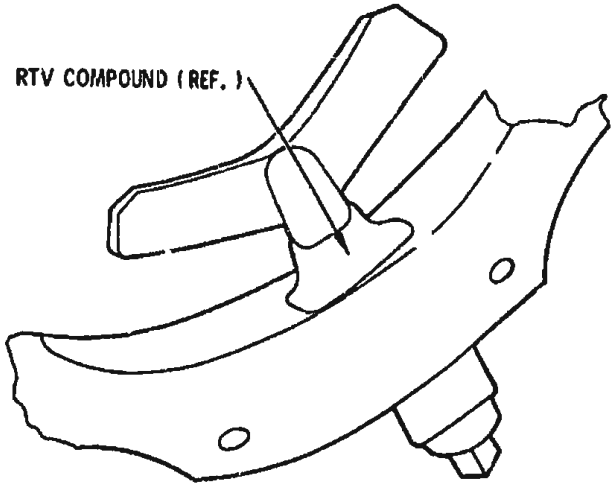
(f) Secure reducer duct to retaining strap.

R (3) Fit access panel 411HR for engine No. 1 or 421HR for engine No. 3.



Pneumatic Relief Valve - Removal and Installation
Figure 401





M1-0001-30-373

R Pneumatic Relief Valve Manual Opening Device Vibration Damping
R Figure 402

R EFFECTIVITY: ALL
R
001B

ENGINE PNEUMATIC RELIEF VALVE ADJUSTMENT AND TEST

1. Adjustment/Test

A. Pneumatic Relief Valve Test

(1) Remove applicable access panel:

Engine No. 1 - 411 HR (Ref. 30-21-22, Fig. 401).

Engine No. 2 - (in fixed inlet structure) small cover attached by two screws at lower left corner of 311KL (Ref. Fig. 501).

Engine No. 3 - 421 HR (Ref. 30-21-22, Fig. 401).

R R (2) Fit torque wrench to manual opening device (square drive) on valve body.

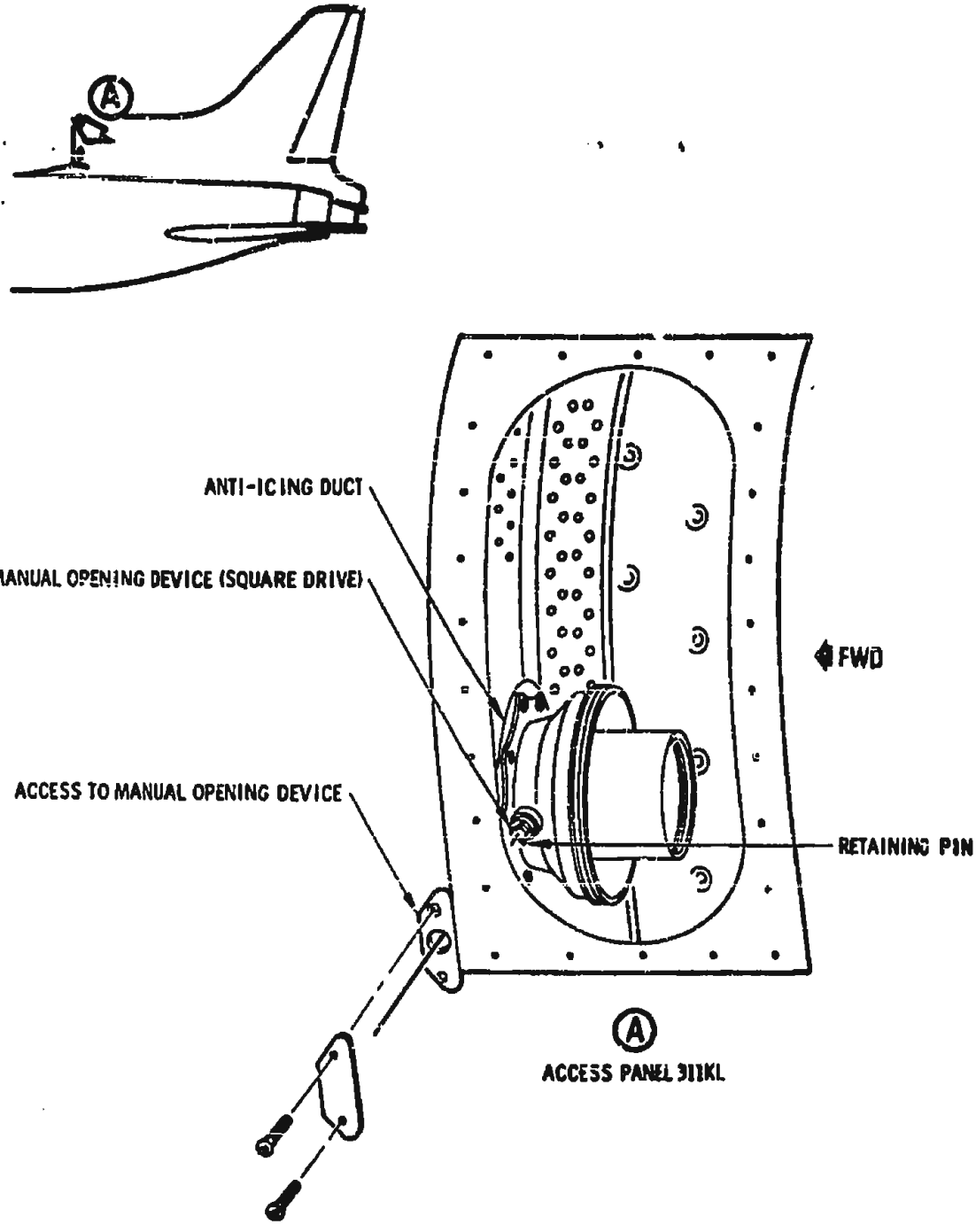
R (3) Push in on wrench to depress drive and release detent, then turn torque wrench and record load to open valve.

R (4) Remove torque wrench and allow valve to close. This will be indicated by the retaining pin of the manual opening device returning to the vertical position.

R (5) Repeat Steps (2) through (4). Torque loads recorded should be between 40 to 70 lb in.

R R NOTE: If upper limit is exceeded in Step (3) but within limits after repeating Step (3), this is acceptable.

R (6) Replace access panel removed in Step (1).



MI-0001-30-221

R Access - No. 2 Engine Pneumatic Relief Valve Manual Opening Device
R Figure 501

ENGINE NO. 2 PNEUMATIC RELIEF VALVE - REMOVAL AND INSTALLATION

1. Materials

Packing, MS 9068-255 or equivalent

2. Removal/Installation

A. Removal

(1) Remove access panel 311KL from center engine fixed inlet structure (Ref. Fig. 401).

(2) Remove overboard discharge duct and packing from relief valve.

(3) Remove bolts and washers.

(4) Remove valve from inlet structure.

B. Installation

NOTE: Minor fretting and wear of lever bore is acceptable provided manual actuation function is not impaired.

Without disassembly, clean lever shaft and bore areas with solvent to remove loose dirt and soot accumulation.

While depressing lever shaft inward toward center of valve, apply RTV 731 (28-CO-152) compound to exposed shaft and bore surfaces.

Build up RTV compound heavily around inner end as shown in sketch below.

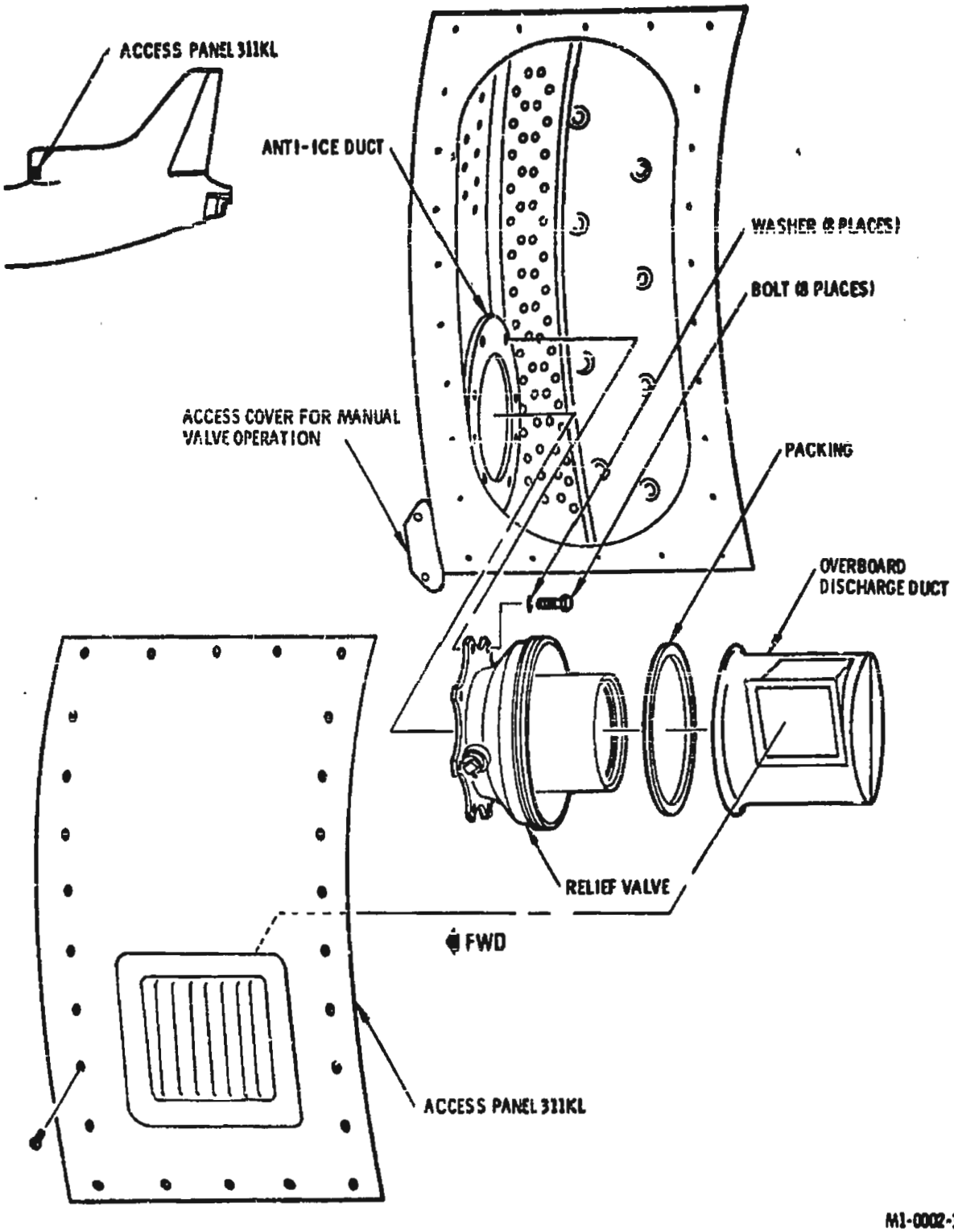
Allow compound to cure per manufacturer's instructions.

(1) Place valve on anti-icing duct so that square drive on valve is aligned with access cover for manual valve operation (Ref. Fig. 401).

(2) Secure valve with bolts and washers.

R (3) Replace packing if necessary and install overboard
R discharge duct.

R (4) Replace access panel 311KL.



Pneumatic Relief Valve - Removal and Installation
Figure 401

AIR DATA SENSOR HEAT SYSTEM - DESCRIPTION AND OPERATION

1. General

Electrical heating is provided for the air data sensors to prevent sensor malfunction due to icing (Ref. Fig. 1).

There are two heating elements (mast and head) in each of the four pitot-static probes (Ref. 34-13-00), single heater elements in each of the two total-air-temperature (T.A.T.) probes (Ref. 34-14-00), and two heating elements in each of the angle-of-attack (alpha) sensors (Ref. 22-04-00). All heating elements are integral parts of the probes and sensors.

One heating element in the alpha sensor is a high-level (approximately 300-watt) heater. The other heating element is a low-level (approximately 30-watt) heater. A normally open thermal switch, in series with the ground path of the low-level heater, prevents low-level heater operation until the high-level
R heater warms the sensor to approximately 90 degrees F.

The AIR DATA SENSOR HEAT control panel is in the pilots overhead panel, zone 210.

The control panel contains four latching switchlights with two OFF legends in each. The switchlights, when depressed (latched in), apply 115V ac to the selected heater elements. The OFF lights come on to indicate that a heating element is not drawing current. Current transformers and logic circuits monitor all heaters except the alpha high-level heaters. The alpha high-level heaters are monitored by the action of the low-level heaters.

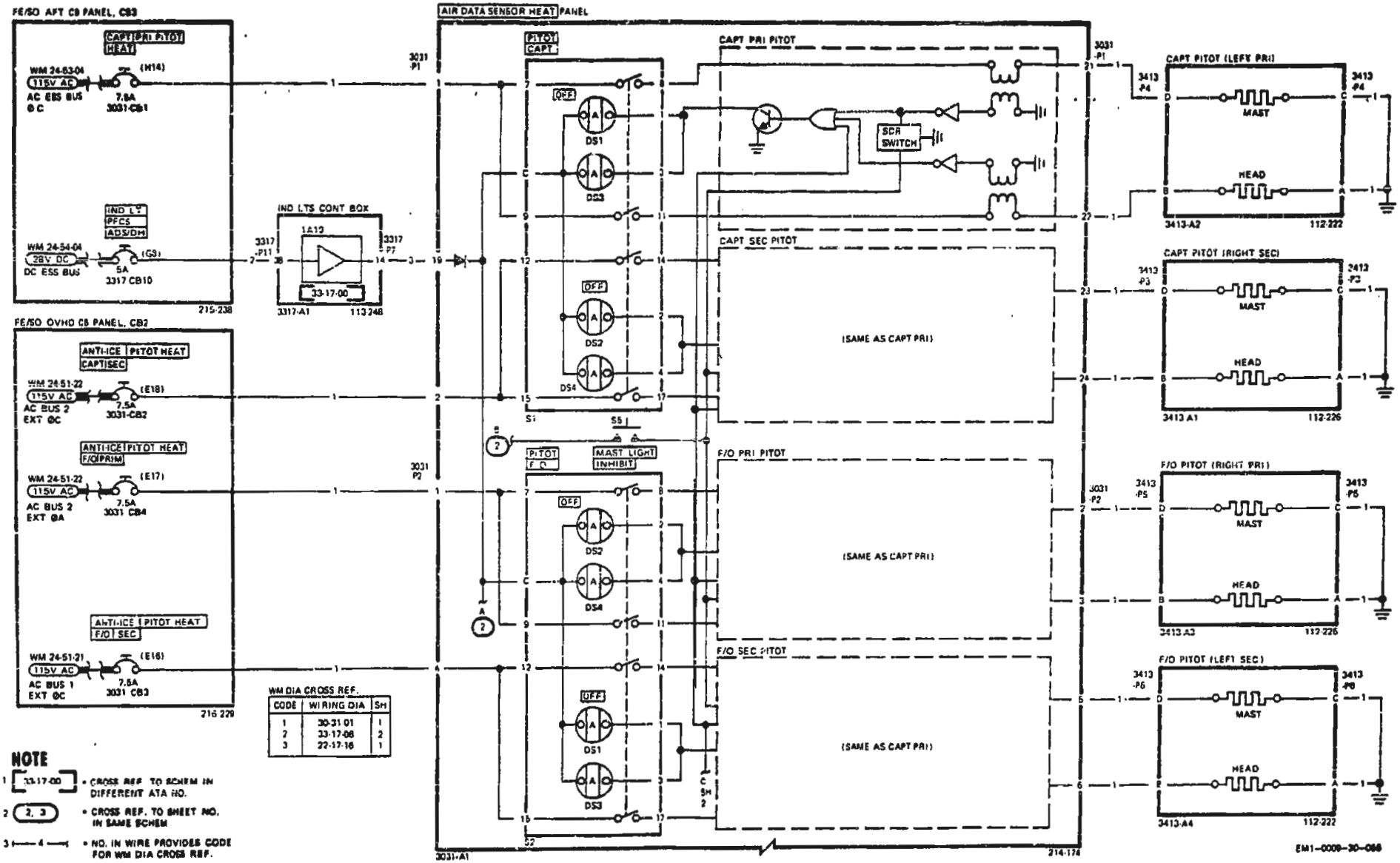
R A MAST LIGHT INHIBIT switch is provided on the panel to inhibit
R the PITOT MAST OFF lights (if desired) in the event of a pitot
R mast heater failure. The INHIBIT switch may also be used to
R isolate a pitot mast or head heater failure.

2. Operation

R With all circuit breakers closed and the switchlights in the off
R position (protruding from panel face), all OFF lights are on.

R When the PITOT and TEMP PROBES switchlights are in the on
R position (flush with panel face), 115V ac is furnished to the
R pitot tube and temperature probe heaters. The current drawn by
R the heaters is sensed at the heater panel and the OFF lights go
R off. The lights are off, when the heaters are operating.

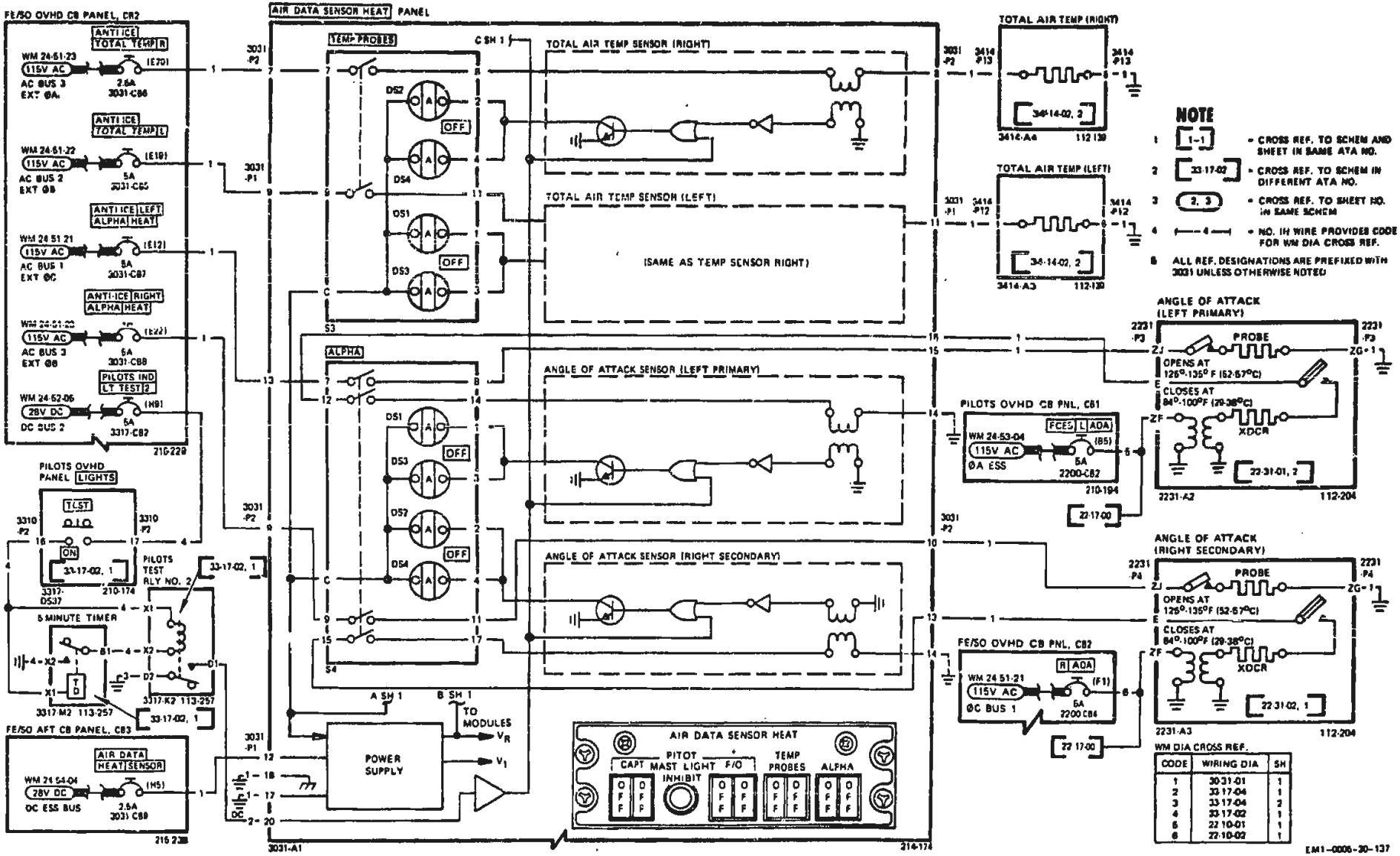
R When the ALPHA switchlight is in the on position (flush with
R panel face) the probe heaters are energized. Heat from the
R probes is conducted to the pressure transducers. The
R temperature of each transducer is sensed by a thermal switch
R that closes, when the transducer is approximately 90 degrees F.
R When the thermal switch closes, the transducer heater begins to
R draw current. The current is sensed at the heater panel and the
R OFF light goes off. The length of time it takes for the ALPHA
R OFF light to go off is a function of the temperature of the
R transducer at the time the system is energized. If the
R temperature of the transducer is such that the thermal switch is
R closed, the ALPHA OFF light will go out immediately. If the
R transducer is cold, because of the ambient environment, the
R ALPHA OFF light will remain on until the transducer is heated to
R approximately 90 degrees F.



R Air Data Sensor Heater System Schematic
R Figure 1 (Sheet 1)

EFFECTIVITY: ALL

001B


FE/SO OVHD CB PANEL, CR2
ANTI ICE TOTAL TEMP R
ANTI ICE TOTAL TEMP L
ANTI ICE LEFT ALPHA HEAT
ANTI ICE RIGHT ALPHA HEAT
PILOTS IND LT TEST 2
AIR DATA SENSOR HEAT PANEL
TEMP PROBES
TOTAL AIR TEMP SENSOR (RIGHT)
TOTAL AIR TEMP SENSOR (LEFT)
(SAME AS TEMP SENSOR RIGHT)
ALPHA
ANGLE OF ATTACK SENSOR (LEFT PRIMARY)
ANGLE OF ATTACK SENSOR (RIGHT SECONDARY)
TOTAL AIR TEMP (RIGHT)
TOTAL AIR TEMP (LEFT)
ANGLE OF ATTACK (LEFT PRIMARY)
ANGLE OF ATTACK (RIGHT SECONDARY)
PROBE
OPENS AT 125°-135°F (52-57°C)
CLOSES AT 84°-100°F (29-38°C)
XDCR
PILOTS OVHD CB PNL, CB1
FE/SO OVHD CB PNL, CB2
PILOTS OVHD PANEL LIGHTS
PILOTS TEST RLY NO. 2
5 MINUTE TIMER
FE/SO AFT CB PANEL, CB3
AIR DATA HEAT SENSOR
POWER SUPPLY
TO MODULES
AIR DATA SENSOR HEAT
PITOT CAPT MAST LIGHT INHIBIT
F/O
TEMP PROBES
ALPHA
NOTE
1 [1-1] - CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2 [33-17-02] - CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3 (2, 3) - CROSS REF. TO SHEET NO. IN SAME SCHEM
4 —4— - NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3031 UNLESS OTHERWISE NOTED
WM DIA CROSS REF.
CODE | WIRING DIA | SH
1 | 30-31-01 | 1
2 | 33-17-04 | 1
3 | 33-17-04 | 2
4 | 33-17-02 | 1
5 | 22-10-01 | 1
6 | 22-10-02 | 1
EM1-0006-30-137

Air Data Sensor Heater System Schematic
Figure 1 (Sheet 2)

EFFECTIVITY: ALL

AIR DATA SENSOR HEAT SYSTEM - FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting Air Data Sensor Heat system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 30 Fault Code Index. The index specifies maintenance manual section, fault isolation diagram figure number, and where appropriate, a block number indicating diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is block 1.

PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. Schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Air Data Sensor Heat system. It gives the area and access of each component and its respective removal and installation reference.

Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all components listed in the Component Location Index. Refer to Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 is a list of all fault isolation data in this section of the manual.

R Air Data Sensor Heat System Fault Isolation
R Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Air Data Sensor Heat ALPHA OFF Light On
104	Air Data Sensor Heat TEMP PROBES or PITOT OFF Light On
105	Air Data Sensor Heat TEMP PROBES, PITOT, or ALPHA OFF Lights Not On
106	Icing Condition Occurs Without Indication of Tube Heater Failure
107	Pitot and/or Temp Probes Cause Erratic Airspeed Indications
SCHEM 1	Air Data Sensor Heater System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BOX – INDICATOR LIGHTS CONTROL:			
ILCB CARD 1A19	1	FESC, RT SIDE/112AB	33-17-04
CIRCUIT BREAKERS:			
AIR DATA –HEAT – SENSOR (3031-CB9)	1	FLT STA/CB3 (H5)	*
ANTI-ICE – LEFT – ALPHA – HEAT (3031-CB7)	1	FLT STA/CB2 (E12)	*
ANTI-ICE – PITOT HEAT – F/O – SEC (3031-CB3)	1	FLT STA/CB2 (E16)	*
ANTI-ICE – PITOT HEAT – F/O – PRIM (3031-CB4)	1	FLT STA/CB2 (E17)	*
ANTI-ICE – PITOT HEAT – CAPT – SEC (3031-CB2)	1	FLT STA/CB2 (E18)	*
ANTI-ICE – TOTAL TEMP – L (3031-CB5)	1	FLT STA/CB2 (E19)	*
ANTI-ICE – TOTAL TEMP – R (3031-CB6)	1	FLT STA/CB2 (E20)	*
ANTI-ICE – RIGHT – ALPHA – HEAT (3031-CB8)	1	FLT STA/CB2 (E22)	*
CAPT – PRI PITOT – HEAT (3031-CB1)	1	FLT STA/CB3 (H14)	*
FCES – L – AOA (2200-CB2)	1	FLT STA/CB1 (B5)	*
IND LT – PFCS – ADS/DH (3031-CB10)	1	FLT STA/CB3 (G8)	*
PILOTS IND – LT TEST – 2 (3317-CB2)	1	FLT STA/CB2 (H9)	*
R–AOA (2200-CB4)	1	FLT STA/CB2 (F1)	*
DETECTOR – ICE	1	LOWER LEFT NOSE SECTION	30-81-01
PANEL - AIR DATA SENSOR HEAT CONTROL	1	FLT STA, PILOTS OVHD PNL/P5	30-31-06
RELAY – PILOTS TEST NO. 2 (3317-K2)	1	FESC, RT SIDE, FS 250-266/112AB	*
SENSOR – ANGLE OF ATTACK	2	NOSE SECTION, EXTERIOR	22-31-06
SENSOR – TOTAL AIR TEMPERATURE	2	NOSE SECTION, EXTERIOR	34-14-06
TIMER – S/O NO. 2 (5 MIN) (3317-M2)	1	FESC, RT SIDE, FS 250-266/112AB	*
TUBE – PITOT STATIC	4	NOSE SECTION, EXTERIOR	34-13-01

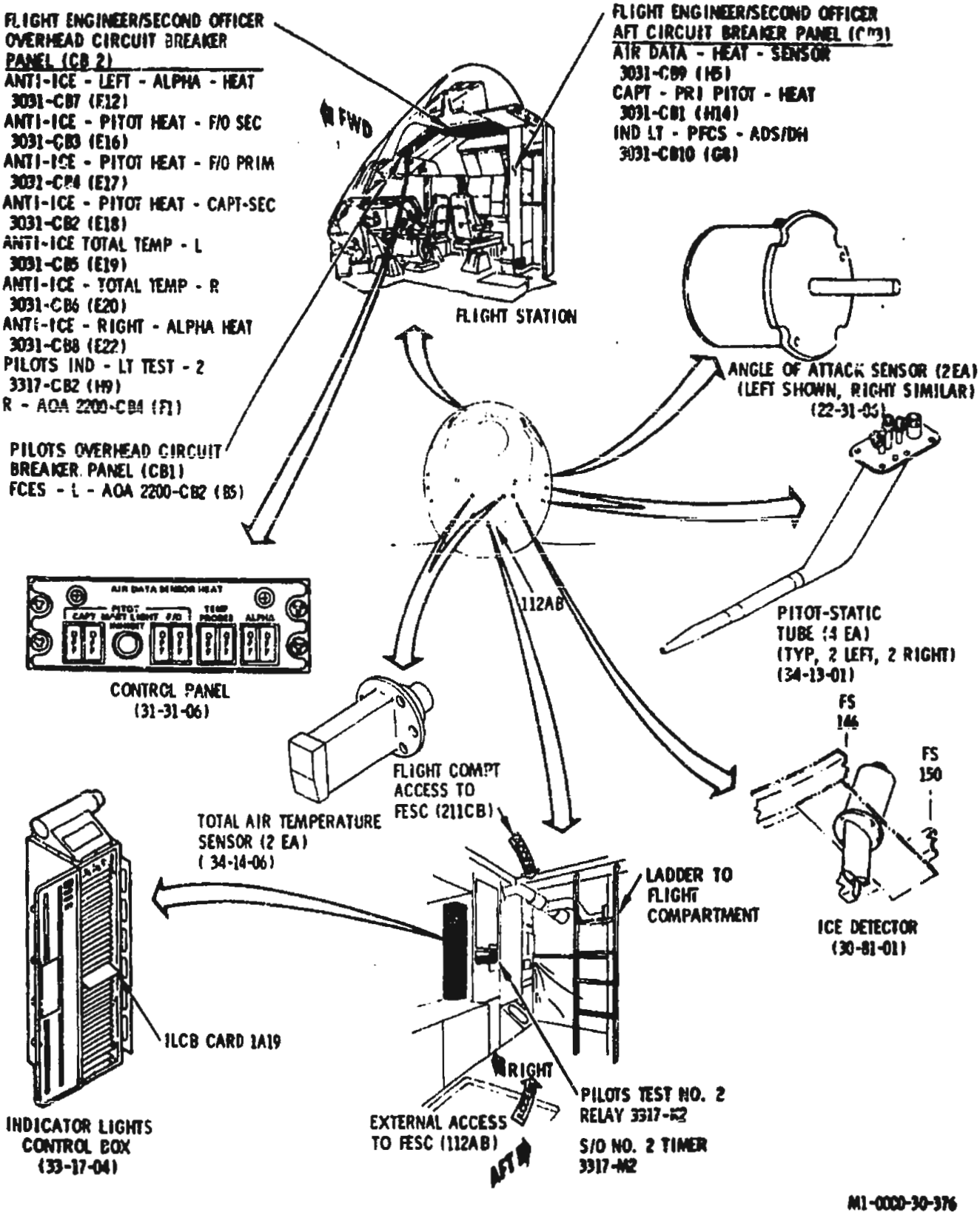
*SEE WM EQUIPMENT LIST

M1–0000–30–375

R Component Location Index
R Figure 101

EFFECTIVITY: ALL

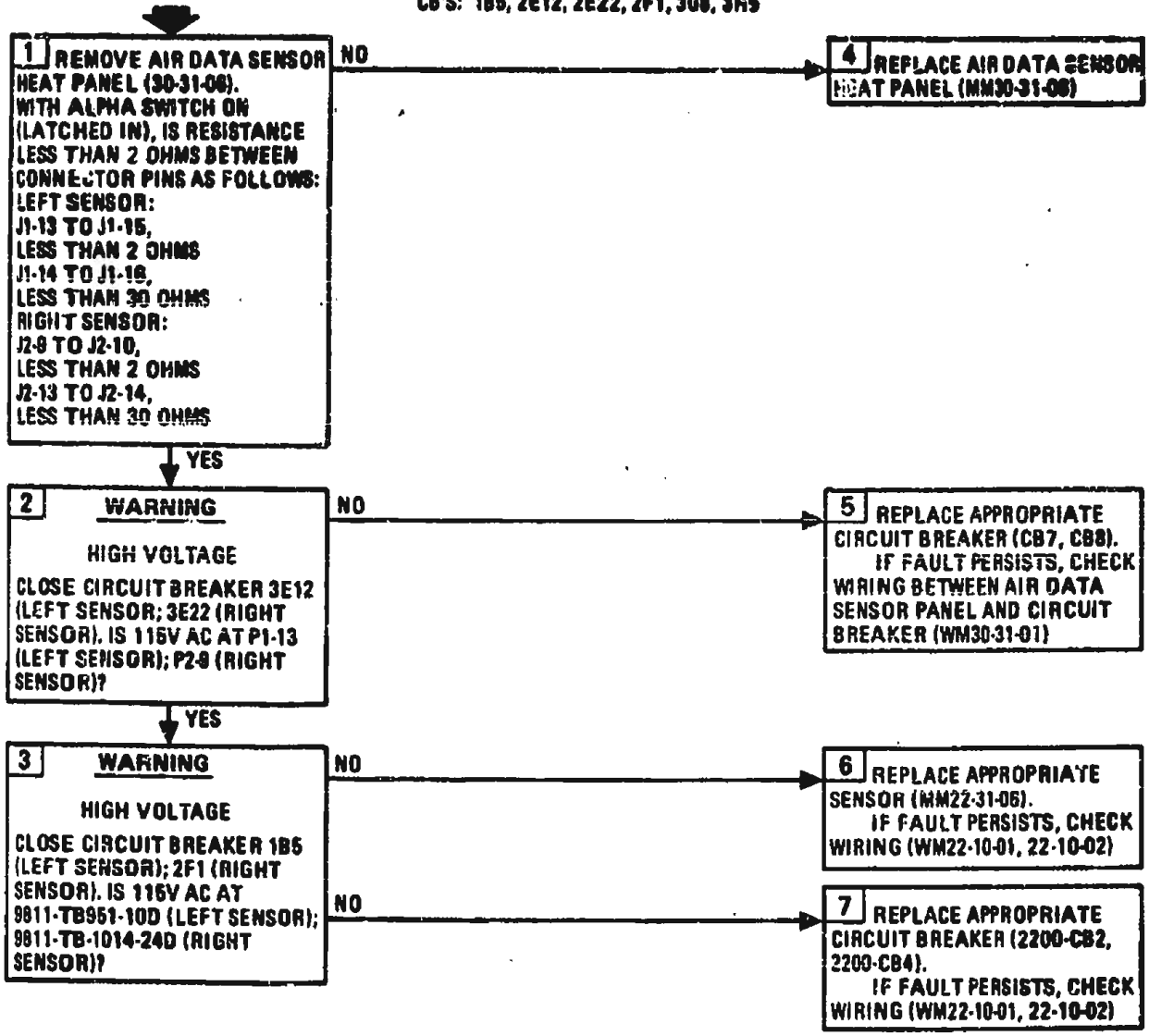
001B


FLIGHT ENGINEER/SECOND OFFICER OVERHEAD CIRCUIT BREAKER PANEL (CB 2)
ANTI-ICE - LEFT - ALPHA - HEAT 3031-CB7 (F12)
ANTI-ICE - PITOT HEAT - F/O SEC 3031-CB3 (E16)
ANTI-ICE - PITOT HEAT - F/O PRIM 3031-CB4 (E17)
ANTI-ICE - PITOT HEAT - CAPT-SEC 3031-CB2 (E18)
ANTI-ICE TOTAL TEMP - L 3031-CB5 (E19)
ANTI-ICE - TOTAL TEMP - R 3031-CB6 (E20)
ANTI-ICE - RIGHT - ALPHA HEAT 3031-CB8 (E22)
PILOTS IND - LT TEST - 2 3317-CB2 (H9)
R - AOA 2200-CB4 (F1)
PILOTS OVERHEAD CIRCUIT BREAKER PANEL (CB1)
FCES - L - AOA 2200-CB2 (B5)
FLIGHT ENGINEER/SECOND OFFICER AFT CIRCUIT BREAKER PANEL (CB3)
AIR DATA - HEAT - SENSOR 3031-CB9 (H5)
CAPT - PRI PITOT - HEAT 3031-CB1 (H14)
IND LT - PFCS - ADS/DH 3031-CB10 (G8)
FWD
FLIGHT STATION
ANGLE OF ATTACK SENSOR (2EA) (LEFT SHOWN, RIGHT SIMILAR) (22-31-03)
112AB
PITOT-STATIC TUBE (4 EA) (TYP, 2 LEFT, 2 RIGHT) (34-13-01)
CONTROL PANEL (31-31-06)
FS 146
FS 150
FLIGHT COMPT ACCESS TO FESC (211CB)
TOTAL AIR TEMPERATURE SENSOR (2 EA) (34-14-06)
LADDER TO FLIGHT COMPARTMENT
ICE DETECTOR (30-81-01)
ILCB CARD 1A19
INDICATOR LIGHTS CONTROL BOX (33-17-04)
RIGHT
EXTERNAL ACCESS TO FESC (112AB)
PILOTS TEST NO. 2 RELAY 3317-K2
S/O NO. 2 TIMER 3317-M2
AFT
M1-0000-30-376

R
R

Component Locator Diagram
Figure 102

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: 1B5, 2E12, 2E22, 2F1, 3G8, 3H5


ALPHA OFF LIGHT ON
1 REMOVE AIR DATA SENSOR HEAT PANEL (30-31-06). WITH ALPHA SWITCH ON (LATCHED IN), IS RESISTANCE LESS THAN 2 OHMS BETWEEN CONNECTOR PINS AS FOLLOWS: LEFT SENSOR: J1-13 TO J1-15, LESS THAN 2 OHMS J1-14 TO J1-16, LESS THAN 30 OHMS RIGHT SENSOR: J2-9 TO J2-10, LESS THAN 2 OHMS J2-13 TO J2-14, LESS THAN 30 OHMS
NO
4 REPLACE AIR DATA SENSOR HEAT PANEL (MM30-31-06)
YES
2 WARNING HIGH VOLTAGE CLOSE CIRCUIT BREAKER 3E12 (LEFT SENSOR; 3E22 (RIGHT SENSOR). IS 115V AC AT P1-13 (LEFT SENSOR); P2-9 (RIGHT SENSOR)?
NO
5 REPLACE APPROPRIATE CIRCUIT BREAKER (CB7, CB8). IF FAULT PERSISTS, CHECK WIRING BETWEEN AIR DATA SENSOR PANEL AND CIRCUIT BREAKER (WM30-31-01)
YES
3 WARNING HIGH VOLTAGE CLOSE CIRCUIT BREAKER 1B5 (LEFT SENSOR); 2F1 (RIGHT SENSOR). IS 115V AC AT 9811-TB951-10D (LEFT SENSOR); 9811-TB-1014-24D (RIGHT SENSOR)?
NO
6 REPLACE APPROPRIATE SENSOR (MM22-31-06). IF FAULT PERSISTS, CHECK WIRING (WM22-10-01, 22-10-02)
NO
7 REPLACE APPROPRIATE CIRCUIT BREAKER (2200-CB2, 2200-CB4). IF FAULT PERSISTS, CHECK WIRING (WM22-10-01, 22-10-02)

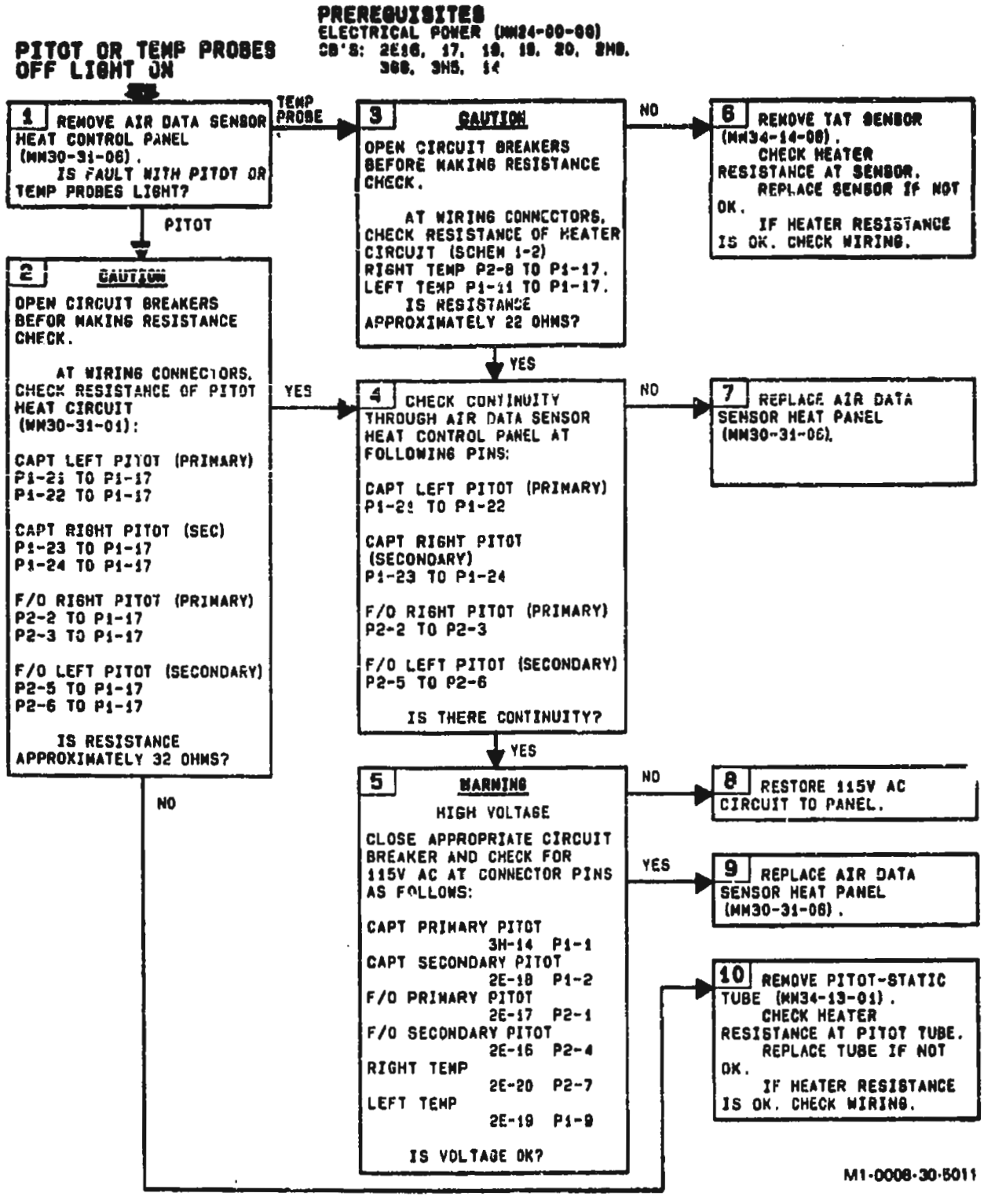
NOTE
ALL VOLTAGES MEASURED TO GROUND.
PREFIX ALL REFERENCE DESIGNATORS WITH 3031 EXCEPT WHERE NOTED

M1-0001-30-305

CR Air Data Sensor Heat ALPHA OFF Light On
CR Figure 103

EFFECTIVITY: ALL

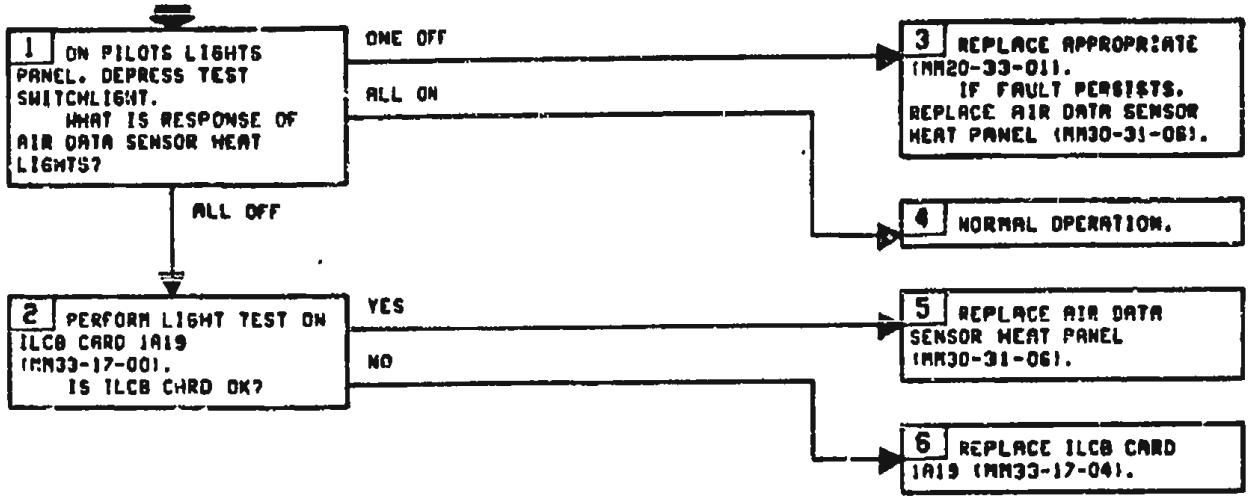
001B


PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: 2E16, 17, 19, 18, 20, 3H8, 3G8, 3H5, 14
PITOT OR TEMP PROBES OFF LIGHT ON
1 REMOVE AIR DATA SENSOR HEAT CONTROL PANEL (MM30-31-06).
IS FAULT WITH PITOT OR TEMP PROBES LIGHT?
TEMP PROBE
PITOT
2 CAUTION
OPEN CIRCUIT BREAKERS BEFOR MAKING RESISTANCE CHECK.
AT WIRING CONNECTORS, CHECK RESISTANCE OF PITOT HEAT CIRCUIT (MM30-31-01):
CAPT LEFT PITOT (PRIMARY)
P1-21 TO P1-17
P1-22 TO P1-17
CAPT RIGHT PITOT (SEC)
P1-23 TO P1-17
P1-24 TO P1-17
F/O RIGHT PITOT (PRIMARY)
P2-2 TO P1-17
P2-3 TO P1-17
F/O LEFT PITOT (SECONDARY)
P2-5 TO P1-17
P2-6 TO P1-17
IS RESISTANCE APPROXIMATELY 32 OHMS?
YES
NO
3 CAUTION
OPEN CIRCUIT BREAKERS BEFORE MAKING RESISTANCE CHECK.
AT WIRING CONNECTORS, CHECK RESISTANCE OF HEATER CIRCUIT (SCHEM 1-2)
RIGHT TEMP P2-8 TO P1-17.
LEFT TEMP P1-11 TO P1-17.
IS RESISTANCE APPROXIMATELY 22 OHMS?
NO
YES
6 REMOVE TAT SENSOR (MM34-14-00).
CHECK HEATER RESISTANCE AT SENSOR.
REPLACE SENSOR IF NOT OK.
IF HEATER RESISTANCE IS OK. CHECK WIRING.
4 CHECK CONTINUITY THROUGH AIR DATA SENSOR HEAT CONTROL PANEL AT FOLLOWING PINS:
CAPT LEFT PITOT (PRIMARY)
P1-21 TO P1-22
CAPT RIGHT PITOT (SECONDARY)
P1-23 TO P1-24
F/O RIGHT PITOT (PRIMARY)
P2-2 TO P2-3
F/O LEFT PITOT (SECONDARY)
P2-5 TO P2-6
IS THERE CONTINUITY?
YES
NO
7 REPLACE AIR DATA SENSOR HEAT PANEL (MM30-31-06).
5 WARNING
HIGH VOLTAGE
CLOSE APPROPRIATE CIRCUIT BREAKER AND CHECK FOR 115V AC AT CONNECTOR PINS AS FOLLOWS:
CAPT PRIMARY PITOT 3H-14 P1-1
CAPT SECONDARY PITOT 2E-18 P1-2
F/O PRIMARY PITOT 2E-17 P2-1
F/O SECONDARY PITOT 2E-16 P2-4
RIGHT TEMP 2E-20 P2-7
LEFT TEMP 2E-19 P1-9
IS VOLTAGE OK?
NO
YES
8 RESTORE 115V AC CIRCUIT TO PANEL.
9 REPLACE AIR DATA SENSOR HEAT PANEL (MM30-31-06).
10 REMOVE PITOT-STATIC TUBE (MM34-13-01).
CHECK HEATER RESISTANCE AT PITOT TUBE.
REPLACE TUBE IF NOT OK.
IF HEATER RESISTANCE IS OK. CHECK WIRING.
M1-0008-30-5011

R Air Data Sensor Heat TEMP PROBES or PITOT OFF Light On
R Figure 104

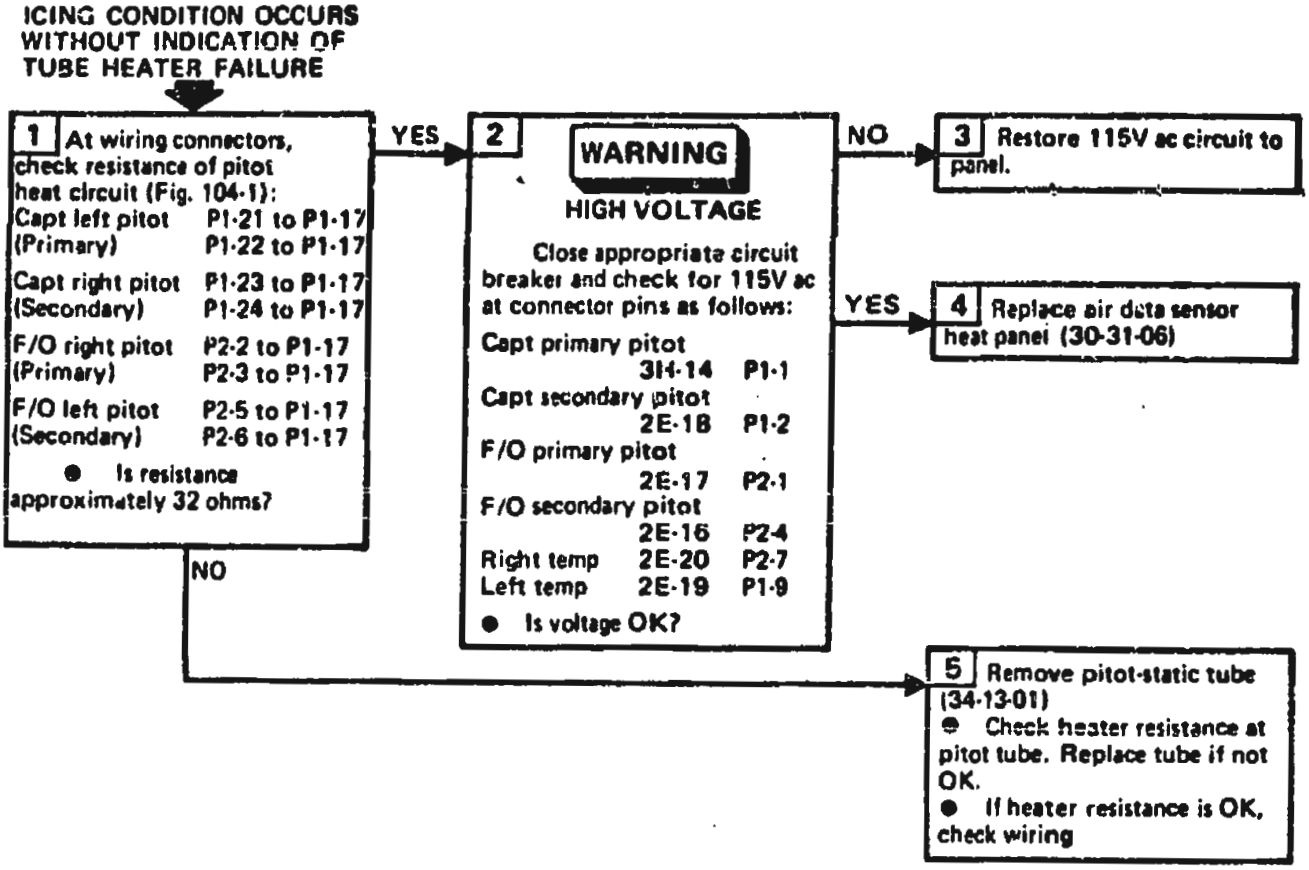
PREREQUISITES
ELECTRICAL POWER (MM24-00-001)
CB'S: 2E12, 16, 17, 18, 19, 20, 23, 2H9, 3G8, 3H5, J4
PITOT, TEMP PROBES, AND ALPHA SWITCHLIGHTS OFF (LATCHED OUT)

AIR DATA SENSOR HEAT PANEL LIGHTS INOPERATIVE


1 ON PILOTS LIGHTS PANEL, DEPRESS TEST SWITCHLIGHT. WHAT IS RESPONSE OF AIR DATA SENSOR HEAT LIGHTS?
ONE OFF
ALL ON
ALL OFF
3 REPLACE APPROPRIATE (MM20-33-011). IF FAULT PERSISTS, REPLACE AIR DATA SENSOR HEAT PANEL (MM30-31-06).
4 NORMAL OPERATION.
2 PERFORM LIGHT TEST ON ILCB CARD 1A19 (MM33-17-001). IS ILCB CARD OK?
YES
NO
5 REPLACE AIR DATA SENSOR HEAT PANEL (MM30-31-06).
6 REPLACE ILCB CARD 1A19 (MM33-17-04).

RI-0003-30-3012

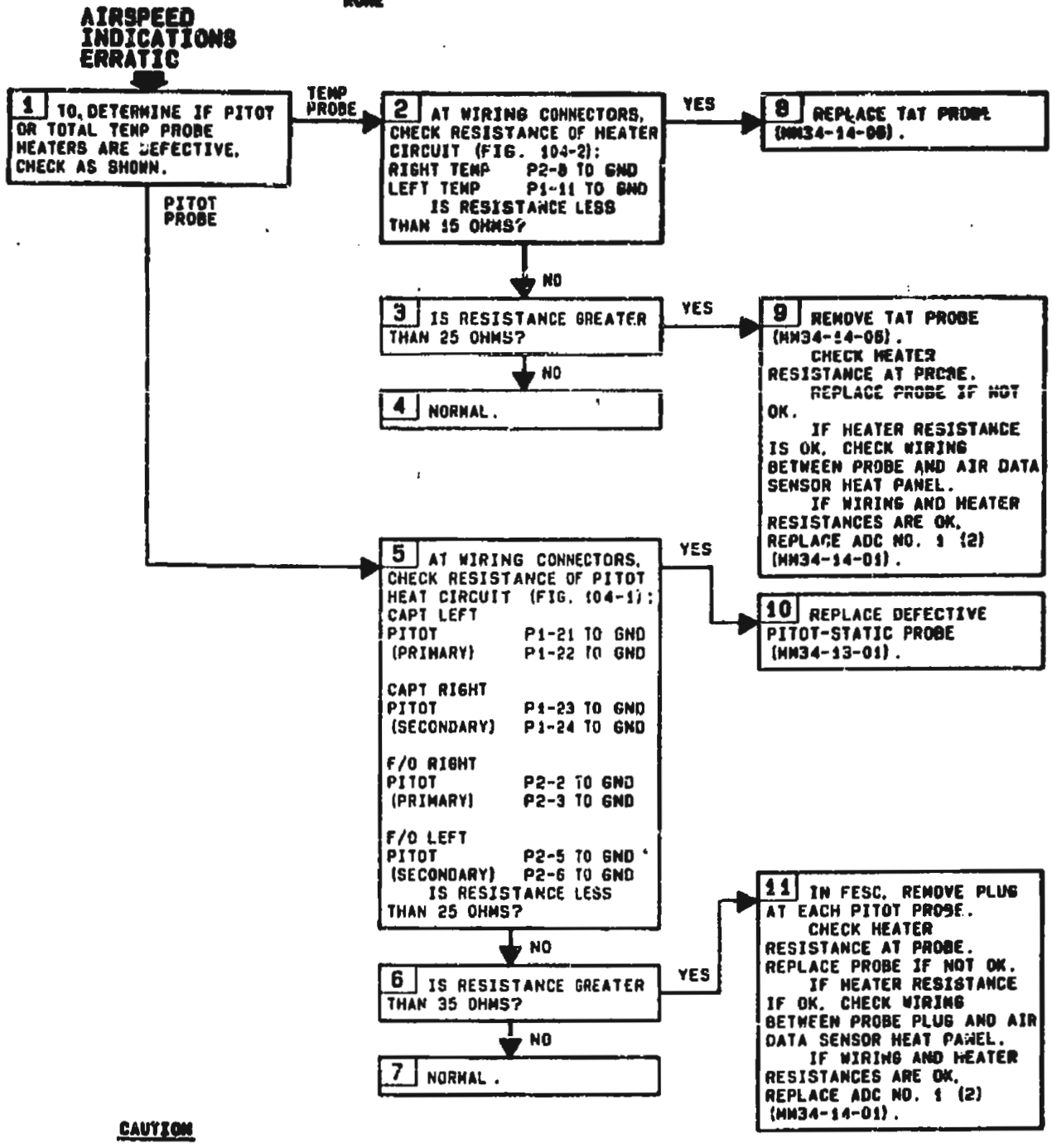
R Air Data Sensor Heat TEMP PROBES, PITOT, or ALPHA OFF Lights Not On
R Figure 105


ICING CONDITION OCCURS WITHOUT INDICATION OF TUBE HEATER FAILURE
1 At wiring connectors, check resistance of pitot heat circuit (Fig. 104-1):
Capt left pitot (Primary) P1-21 to P1-17
P1-22 to P1-17
Capt right pitot (Secondary) P1-23 to P1-17
P1-24 to P1-17
F/O right pitot (Primary) P2-2 to P1-17
P2-3 to P1-17
F/O left pitot (Secondary) P2-5 to P1-17
P2-6 to P1-17
● Is resistance approximately 32 ohms?
YES
NO
2 WARNING
HIGH VOLTAGE
Close appropriate circuit breaker and check for 115V ac at connector pins as follows:
Capt primary pitot 3H-14 P1-1
Capt secondary pitot 2E-18 P1-2
F/O primary pitot 2E-17 P2-1
F/O secondary pitot 2E-16 P2-4
Right temp 2E-20 P2-7
Left temp 2E-19 P1-9
● Is voltage OK?
NO
3 Restore 115V ac circuit to panel.
YES
4 Replace air data sensor heat panel (30-31-06)
5 Remove pitot-static tube (34-13-01)
● Check heater resistance at pitot tube. Replace tube if not OK.
● If heater resistance is OK, check wiring

M1-0100-30-5023

R Icing Condition Occurs Without Indication of Tube Heater Failure
R Figure 106

PREREQUISITES
NONE

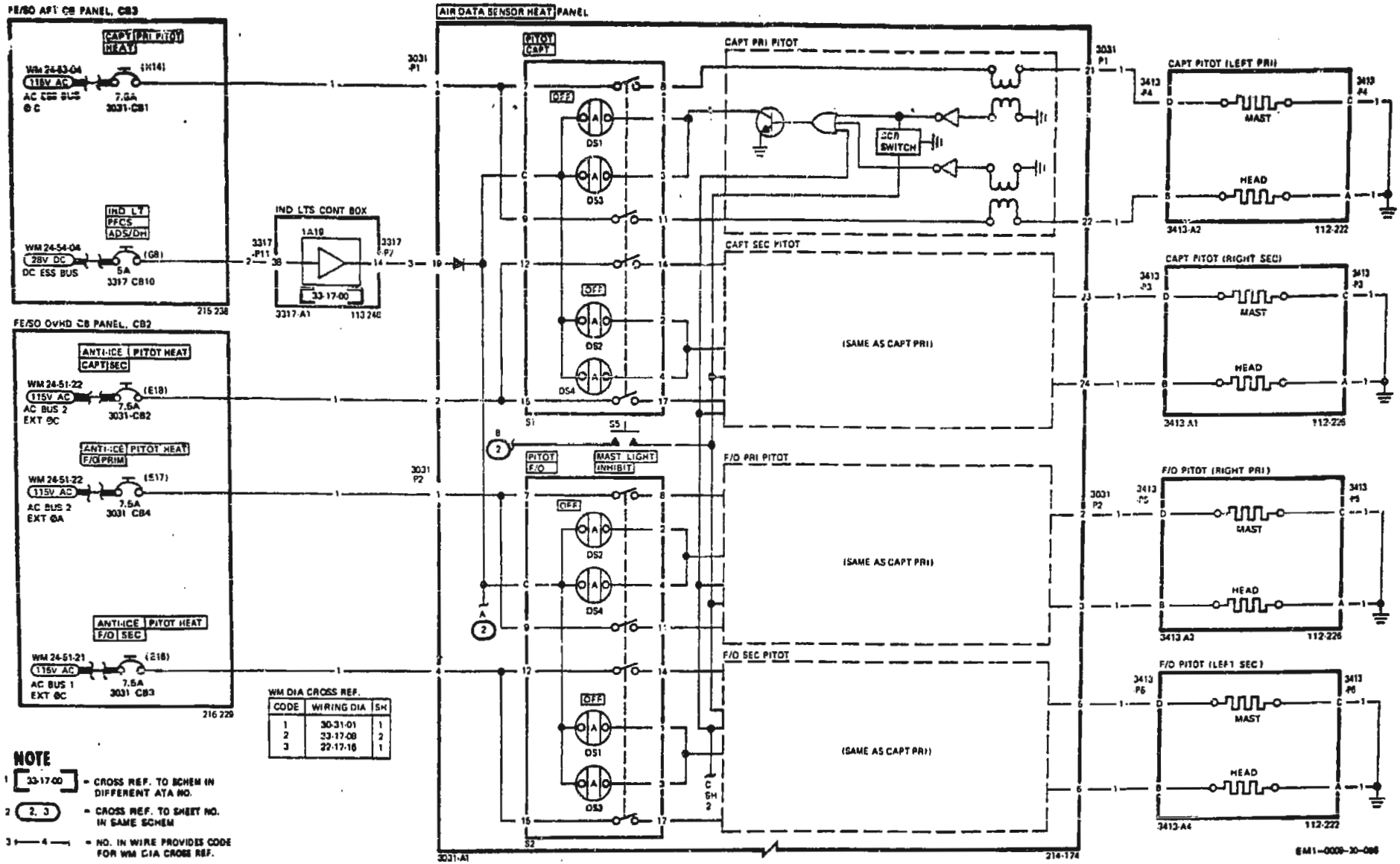

AIRSPEED INDICATIONS ERRATIC
1 TO DETERMINE IF PITOT OR TOTAL TEMP PROBE HEATERS ARE DEFECTIVE, CHECK AS SHOWN.
TEMP PROBE
PITOT PROBE
2 AT WIRING CONNECTORS, CHECK RESISTANCE OF HEATER CIRCUIT (FIG. 104-2):
RIGHT TEMP P2-8 TO GND
LEFT TEMP P1-11 TO GND
IS RESISTANCE LESS THAN 15 OHMS?
YES
8 REPLACE TAT PROBE (HM34-14-06).
NO
3 IS RESISTANCE GREATER THAN 25 OHMS?
YES
9 REMOVE TAT PROBE (HM34-14-06).
CHECK HEATER RESISTANCE AT PROBE.
REPLACE PROBE IF NOT OK.
IF HEATER RESISTANCE IS OK, CHECK WIRING BETWEEN PROBE AND AIR DATA SENSOR HEAT PANEL.
IF WIRING AND HEATER RESISTANCES ARE OK, REPLACE ADC NO. 1 (2) (HM34-14-01).
NO
4 NORMAL.
5 AT WIRING CONNECTORS, CHECK RESISTANCE OF PITOT HEAT CIRCUIT (FIG. 104-1):
CAPT LEFT
PITOT (PRIMARY) P1-21 TO GND
P1-22 TO GND
CAPT RIGHT
PITOT (SECONDARY) P1-23 TO GND
P1-24 TO GND
F/O RIGHT
PITOT (PRIMARY) P2-2 TO GND
P2-3 TO GND
F/O LEFT
PITOT (SECONDARY) P2-5 TO GND
P2-6 TO GND
IS RESISTANCE LESS THAN 25 OHMS?
YES
10 REPLACE DEFECTIVE PITOT-STATIC PROBE (HM34-13-01).
NO
6 IS RESISTANCE GREATER THAN 35 OHMS?
YES
11 IN FESC, REMOVE PLUG AT EACH PITOT PROBE.
CHECK HEATER RESISTANCE AT PROBE.
REPLACE PROBE IF NOT OK.
IF HEATER RESISTANCE IF OK, CHECK WIRING BETWEEN PROBE PLUG AND AIR DATA SENSOR HEAT PANEL.
IF WIRING AND HEATER RESISTANCES ARE OK, REPLACE ADC NO. 1 (2) (HM34-14-01).
NO
7 NORMAL.

CAUTION

NEVER REPLACE ADC BEFORE FIRST DETERMINING STATUS OF PROBE HEATERS

M1-0001-30-5026

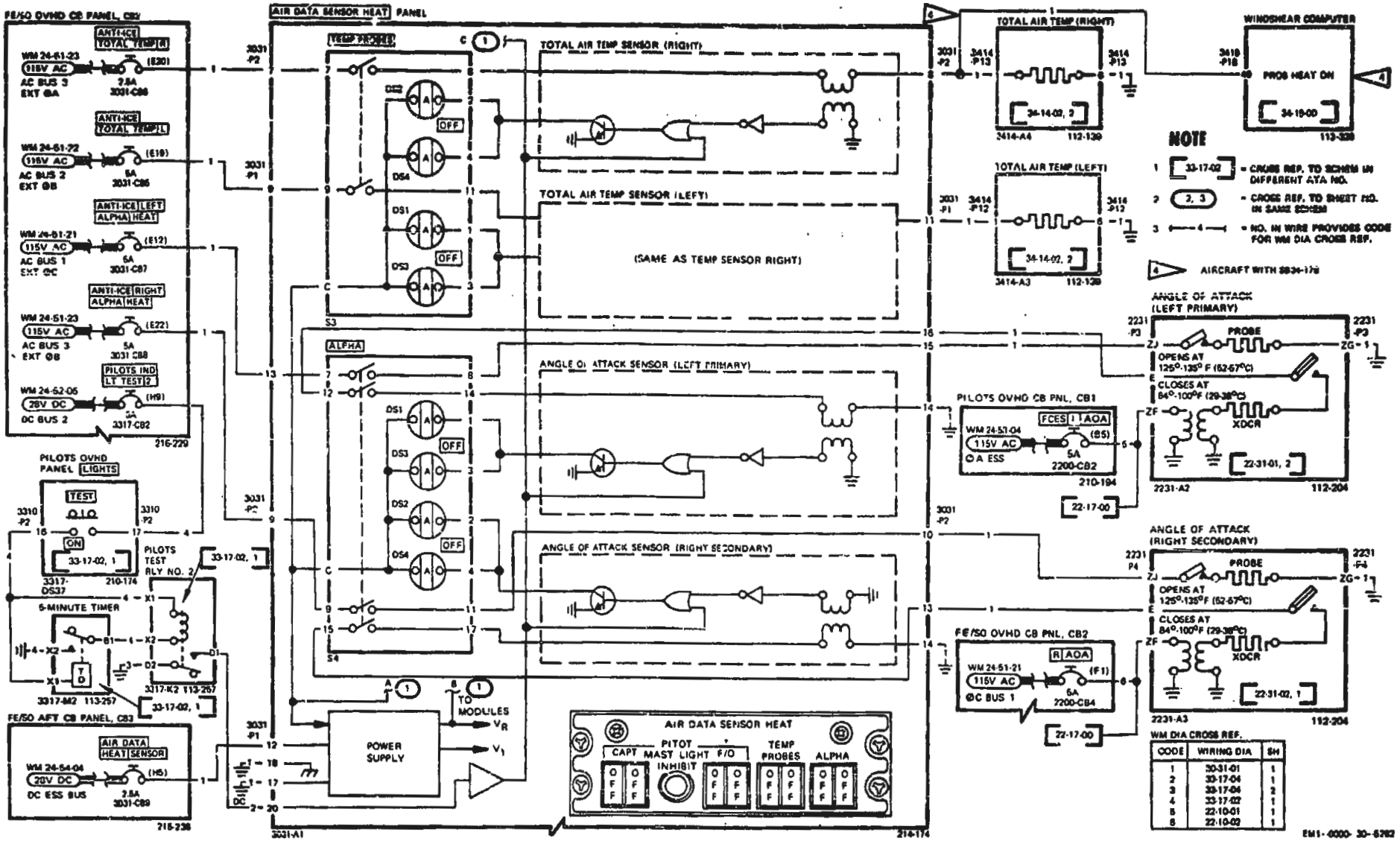
R Pitot and/or Total Temp Probes Cause Erratic Airspeed Indications
R Figure 107



R Air Data Sensor Heater System Schematic
R SCHEM 1 (Sheet 1)

EFFECTIVITY: ALL

001B


FE/SO OVHD CB PANEL, CB1
AIR DATA SENSOR HEAT PANEL
TOTAL AIR TEMP SENSOR (RIGHT)
TOTAL AIR TEMP SENSOR (LEFT)
(SAME AS TEMP SENSOR RIGHT)
ANGLE OF ATTACK SENSOR (LEFT PRIMARY)
ANGLE OF ATTACK SENSOR (RIGHT SECONDARY)
TOTAL AIR TEMP (RIGHT)
TOTAL AIR TEMP (LEFT)
WINDSHEAR COMPUTER
PROB HEAT ON
PILOTS OVHD CB PNL, CB1
FE/SO OVHD CB PNL, CB2
PILOTS OVHD PANEL LIGHTS
FE/SO AFT CB PANEL, CB3
POWER SUPPLY
TO MODULES
AIR DATA SENSOR HEAT
CAPT PITOT MAST HEAT
LIGHT INHIBIT
F/O PITOT MAST HEAT
TEMP PROBES
ALPHA
PROBE
OPENS AT 125°-135°F (52-57°C)
CLOSES AT 84°-100°F (29-38°C)
XDCR
NOTE
1 33-17-02 = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
2 2, 3 = CROSS REF. TO SHEET NO. IN SAME SCHEM
3 4 = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
4 AIRCRAFT WITH SB34-178
WM DIA CROSS REF.
CODE WIRING DIA SH
1 30-31-01 1
2 33-17-04 1
3 33-17-04 2
4 33-17-02 1
5 22-10-01 1
6 22-10-02 1

R Air Data Sensor Heater System Schematic
R SCHEM 1 (Sheet 2)

EFFECTIVITY: ALL

Air Data Sensor Heat System Maintenance Practices

1. General

The electrical heating is provided for the air data sensors to prevent malfunction due to icing. The temperature probe switchlight is in the on position when flushed with panel face. The panel light is off, when heaters are operating.

2. Referenced Procedures

22-31-00	Speed Control System
24-00-00	Electrical Power System - Maintenance Practice
30-31-06	Air Data Sensor Heat Control Panel - Removal and Installation
34-13-00	Pitot-Static System
34-14-00	Air Data Computer System

3. Maintenance Practices

A. The air data sensor heaters are integral parts of the air data sensors and cannot be separated. The air data sensors consist of the following:

(1) Pitot-static probes (Ref. 34-13-00)

(2) Total-air-temperature probes (Ref. 34-14-00)

(3) Angle-of-attack sensors (Ref. 22-31-00).

B. Deactivation

R NOTE: This deactivation procedure applies only when an
R aircraft is to be dispatched in accordance with the
R MEL.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On Flight Engineer/Second Officer overhead circuit breaker panel CB2, zone 210, verify the following circuit breakers are closed: Anti-Ice-Total Temp L (E19) and R (E20).

(3) On Pilots overhead panel, zone 210, verify Temp Probes light is on. Press switchlight temp probe off (flushed with panel) to on position and verify panel light goes off (heater unit operating properly).

NOTE: If one or both lights remain on, heater unit indicates inoperative, placarded Air Data Sensor Heat panel in cockpit.

(4) Open and collar circuit breakers, closed in Step 3B(2).

(5) Turn off electrical power (Ref. 24-00-00).

(6) Make appropriate entry in aircraft log book.

AIR DATA SENSOR HEAT SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

24-41-00 External Power/Ground Service System - Maintenance Practices

30-31-06 Air Data Sensor Heat Control Panel - Removal and Installation

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-41-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that the following circuit breakers are closed:

ANTI-ICE - PITOT HEAT - F/O SEC (E16)

ANTI-ICE - PITOT HEAT - F/O PRIM (E17)

ANTI-ICE - PITOT HEAT - CAPT SEC (E18)

ANTI-ICE - TOTAL TEMP - L (E19)

ANTI-ICE - TOTAL TEMP - R (E20)

ANTI-ICE - LEFT ALPHA HEAT (E12)

ANTI-ICE - RIGHT ALPHA HEAT (E22)

FLIGHT STATION MISC - R AOA (F1)

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, verify that the following circuit breakers are closed:

CAPT - PRI PITOT HEAT (H14)

AIR DATA HEAT SENSORS (H5)

IND LT - PFCS ADS/DH (G8)

On pilots overhead circuit breaker panel CB1, zone 210, verify that the following circuit breakers are closed:

AVIONICS FLIGHT CONTROL SYSTEM - FCES - COMPUTERS - L - AC & AOA (B5)

MISC - ANN RESET (L9)

(3) On AIR DATA SENSOR HEAT control panel, zone 210, with all switchlights off (latched out), verify that all lights are on.

CAUTION: OPERATE PROBE AND PITOT TUBE HEATERS ONLY LONG ENOUGH TO VERIFY OPERATION.

(4) With each switchlight on (latched in), verify that lights go off. Turn each switchlight off (latched out) as soon as each heater has been checked.

NOTE: The switchlights control voltages to the heaters.

All lights except the ALPHA lights will go off when the heaters start to draw current. The ALPHA lights will not go off until the angle-of-attack transducer reaches the design temperature. The time of delay is a function of outside ambient temperature.

(5) Depress (latch in) ALPHA switchlight. Both ALPHA OFF lights go off.

CR CR (6) Release (latch out) ALPHA switchlight. Both ALPHA OFF lights come on.

AIR DATA SENSOR HEAT CONTROL PANEL - REMOVAL AND INSTALLATION

1. Referenced Procedures

30-31-00 Air Data Sensor Heat System - Adjustment and Test

2. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag the following circuit breakers:

R 5 VAC PANEL LIGHTING - OVERHEAD - R CTR (M9)

R FLIGHT STATION MISC - R - AOA (F1)

R ANTI-ICE - PITOT HEAT - P2 SEL (E16) P2 PRIM (E17) CAPT
R SEL (E18)

R ANTI-ICE - TOTAL TEMP - L (E19) R (E20)

R ANTI-ICE - LEFT - ALPHA - HEAT (E12) RIGHT - ALPHA -
R HEAT (E22)

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag the following circuit breakers:

CAPT - PRI PITOT - HEAT (H14)

AIR DATA - HEAT - SENSOR (H5)

On pilots overhead circuit breaker panel CB1, zone 210, open and tag following circuit breakers:

MISC - ANN - RESET (L9)

AVIONIC FLIGHT CONTROL SYSTEM - FCES - L - AOA (B5)

(2) On pilots overhead panel, zone 210, disconnect tri-wing fasteners on AIR DATA SENSOR HEAT control panel.

(3) Pull panel out far enough to remove rear electrical connector, then finish removal of panel.

B. Installation

(1) Verify that circuit breakers opened in Step 2A(1) are open and tagged.

(2) Connect electrical connector to AIR DATA SENSOR HEAT control panel, install in pilots overhead panel, and secure with tri-wing fasteners.

(3) Remove tags and close circuit breakers opened in Step 2A(1).

(4) Verify operation of air data sensor heat system (Ref. 30-31-00).

WINDSHIELD TEMPERATURE CONTROL AND DEFOGGING SYSTEM DESCRIPTION AND OPERATION

1. General

NOTE: The aft side window temperature controllers have been
R removed and the wiring deactivated.

The windshield temperature control and defogging system maintains the flight station windshields (Ref. 56-10-00) clear of ice and fog and the side windows clear of fog. The system consists of two subsystems. One subsystem is for windshield and window temperature control. It has separate controllers, switchlights, and heaters for each of the two windshields and
R the two forward side windows. The second subsystem is for windshield defogging. It consists of a defogging fan, a switchlight, and ducting.

The WINDSHIELD HEAT control panel, located on the pilots overhead panel, zone 212, controls both subsystems. The panel includes six switchlights for windshield and side window heat control, a switchlight for the defogging fan, and a system test switch. The aft side window heat system has been deactivated. Electronic controllers regulate the temperatures of the windshields and side window panels.

The side window controllers are rated for 1500 watts with an input of 115 V ac, 400 Hz. The output of each side window controller is an on-off voltage function that supplies each window heating element with the required power.

The windshield controllers are rated for 6000 watts with an input of 200 V ac, 400 Hz. The output of each windshield controller is an on-off voltage function incorporating a ramp voltage warmup time to minimize thermal stresses in the windshield during initial power application. When the ramp warmup time cuts off, the output of the controller becomes an on-off function to maintain the windshield at the correct temperature.

Outer surface temperatures of the windshield panels are monitored by sensors located between the glass abrasion shield and the outer acrylic ply. Side window temperatures are monitored by sensors located between the two acrylic plies. These sensors function in conjunction with the temperature controllers to control the heat of the windshields and side windows. Each panel contains three sensors, two provide normal and overheat control. A third is provided as a spare should one fail.

The window panels are protected by overtemperature and fault-detection systems.

2. Operation

The windshield temperature control and defogging system functions automatically after the system is energized and placed in the normal mode of operation.

A. Windshield and Side Window Temperature Control

The temperature-sensitive sensors (Ref. Fig. 1 and 2) signal their respective controllers to regulate electrical power to keep the window at a constant temperature of 95 degrees F (35 degrees C).

(1) Windshield Temperature Control

The windshield temperature control has two modes of operation: the normal mode, and the idle mode.

When the window temperature control is in the normal mode, switchlight depressed (latched in), the IDLE light is off and the temperature is controlled to 95 degrees F (35 degrees C).

When the windshield temperature control is in the IDLE mode, switchlight released (out), the IDLE light is on and the temperature is controlled to 50 degrees F (10 degrees C).

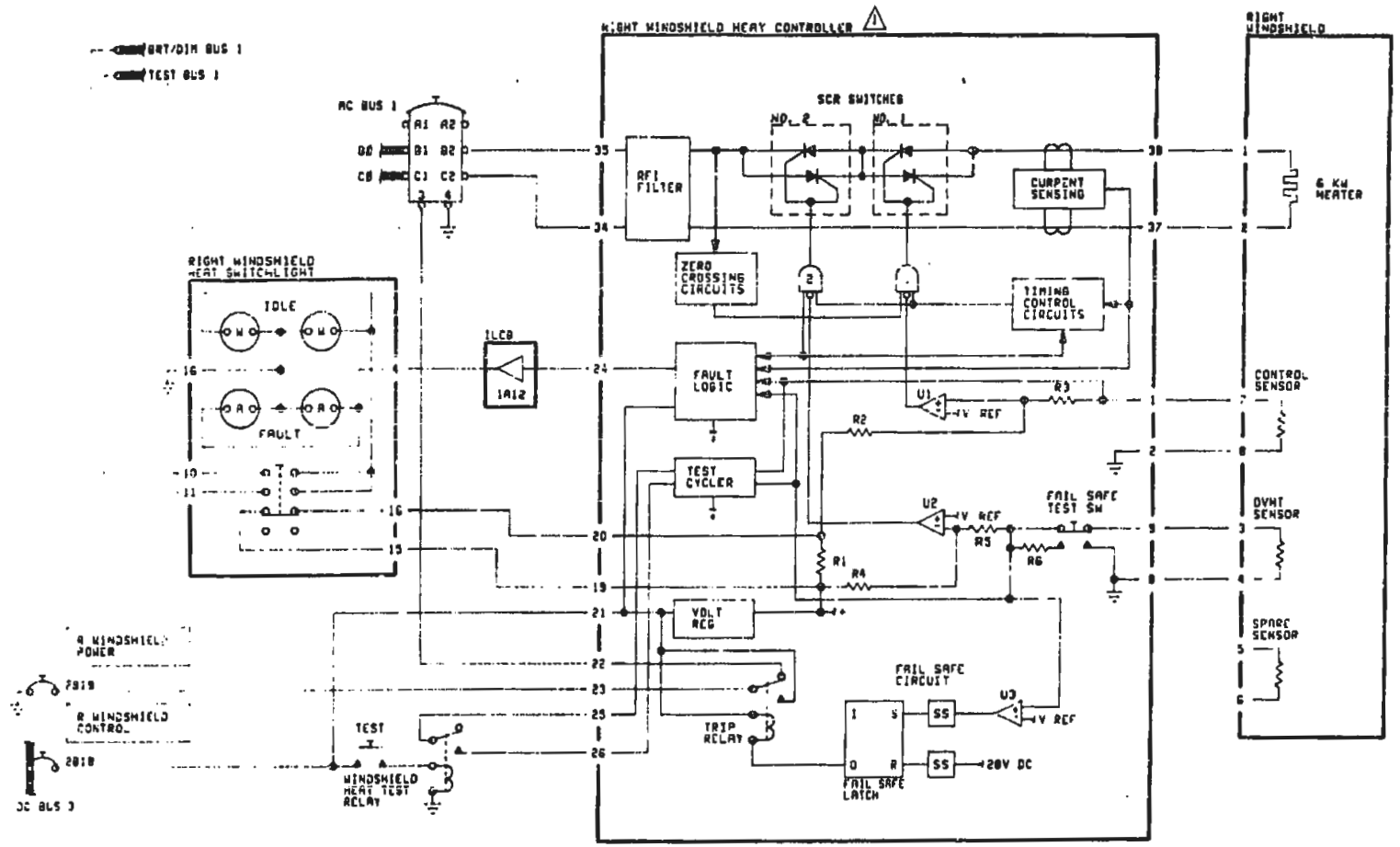
(2) Side Window Temperature Control

R NOTE: The aft side window temperature controllers have been removed and the wiring deactivated.

A switchlight controls the electrical power to each side window. In the on mode, switchlight depressed, no light is on and the window temperature is controlled to 95 degrees F (35 degrees C). When the switchlight is released, the OFF light is on and no power is applied to the window heater.

(3) Overheat Control

The overheat circuitry protects the windshields and side windows from heating over 125 degrees F (51.7 degrees C). If an overheat condition is detected, the FAULT light comes on and power is interrupted at 125 degrees F (51.7 degrees C). The power is reactivated at 95 degrees F (35 degrees C). The controller



NOTE

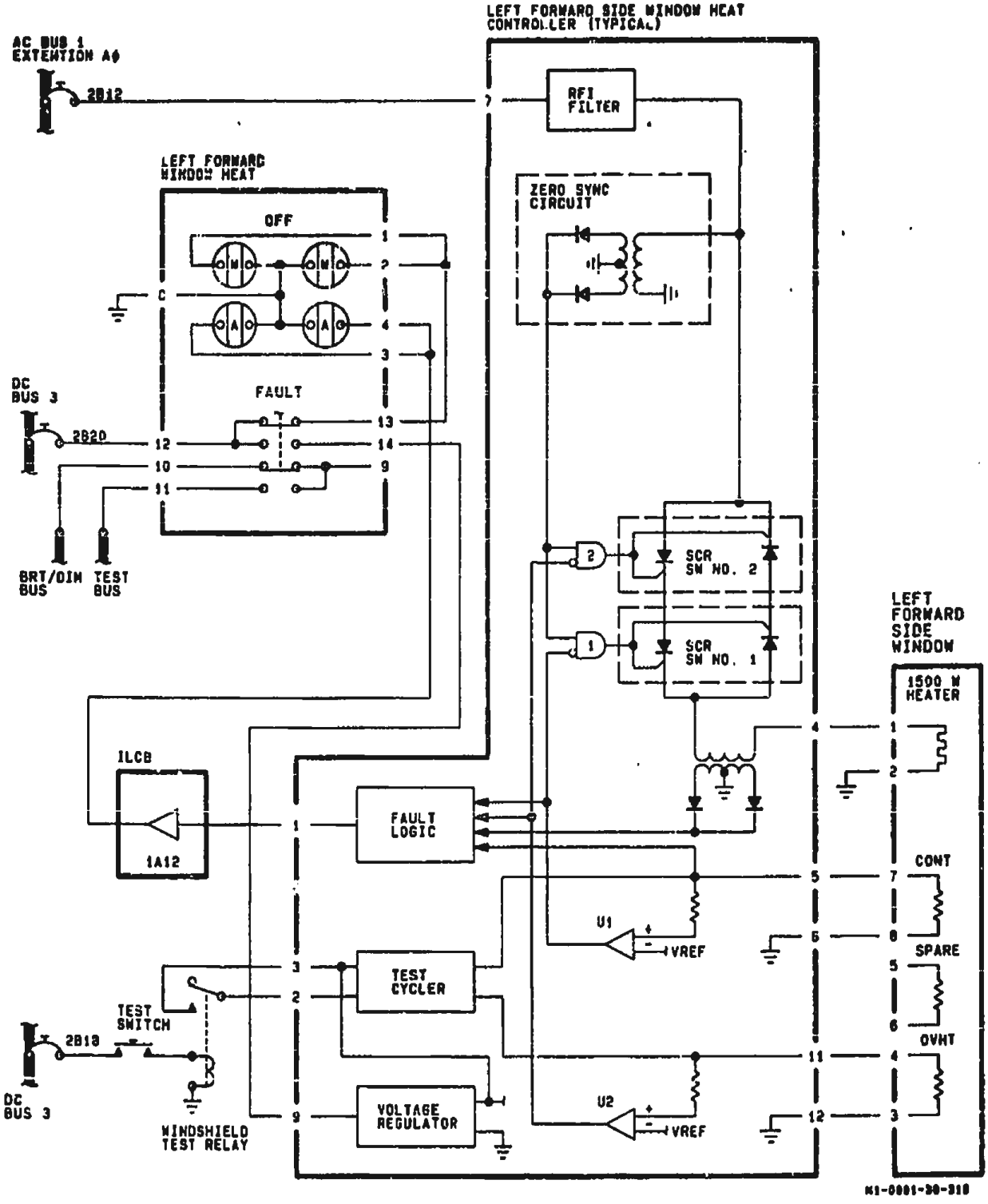
1. LEFT WINDSHIELD HEAT CONTROLLER IS THE SAME EXCEPT IS POWERED FROM DIFFERENT CIRCUIT BREAKERS AND ACCB USES 8A AND 8B

R1-0000-30-315

R Windshield Temperature Control System Schematic
R Figure 1

EFFECTIVITY: ALL

0018



R Side Window Temperature Control System Schematic
R Figure 2

functions as an electronic on/off switch between 95 and 125 degrees F (35 and 51.7 degrees C) until the fault is corrected.

If the temperature drops below 95 degrees F (35 degrees C) and heater power is not applied, the FAULT light comes on. A FAULT light comes on when there is an open or shorted sensor during either normal or overheat operation.

An open heater element, or no ac input power to a system also causes the FAULT light to come on.

(4) Test Circuit

A system test circuit is included in the window temperature control system to detect system faults.

To enable the test circuit all SIDE WINDOW switchlights must be depressed and the WINDSHIELD switchlights may be in either the IDLE or normal position and the TEST switch held depressed. The test results are:

(a) Normal - All FAULT lights cycle on and off at 1 to 2 hertz.

(b) Control Circuit Fault - FAULT light for particular system comes on steadily.

(c) Overheat Control Circuit Fault - FAULT light for particular system comes on, then goes out.

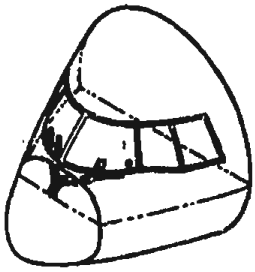
(d) Heater Element Burned Out - FAULT light is on before test, and cycles on and off at 1 to 2 hertz during test.

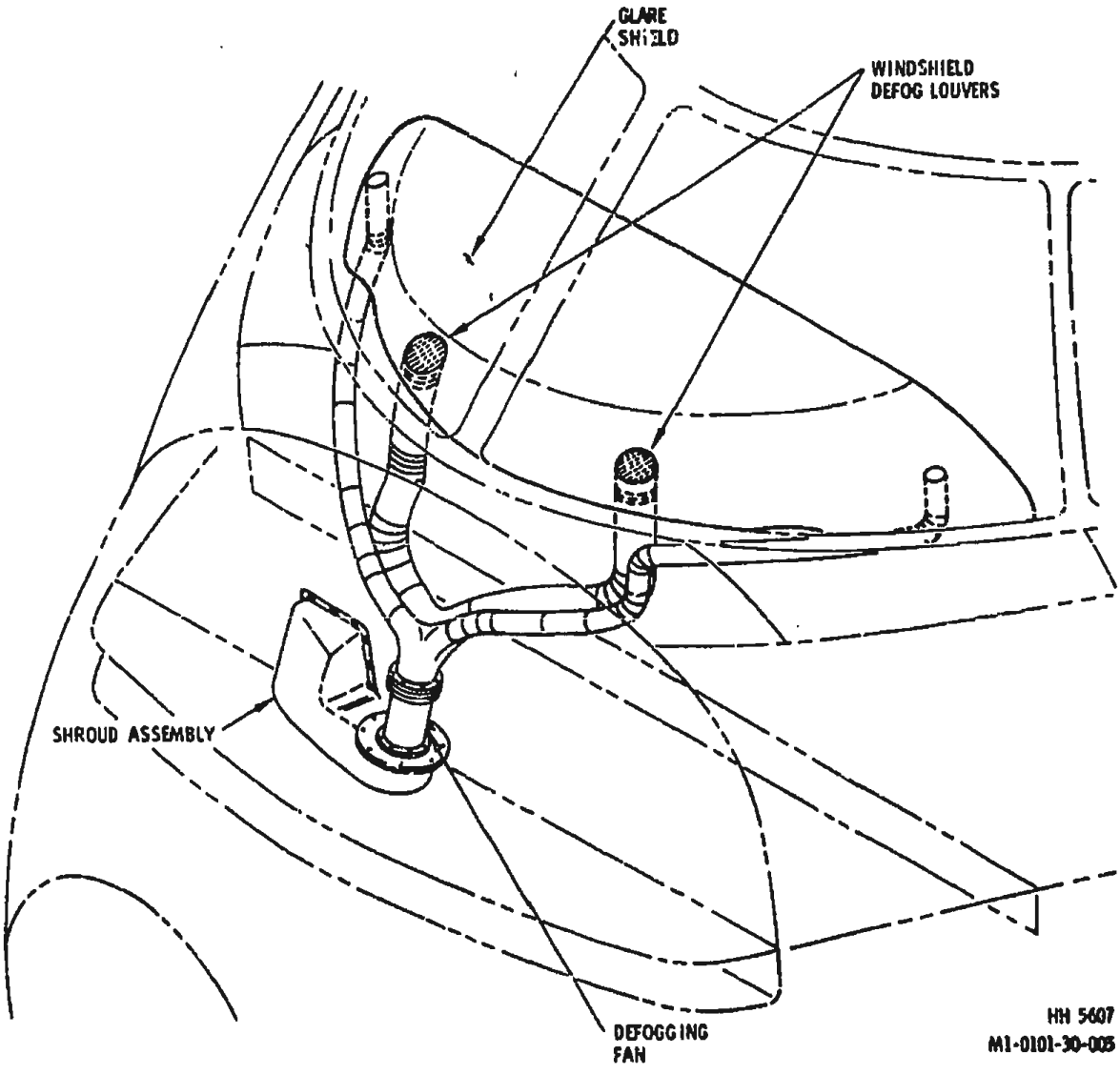
B. Windshield Defogging

The windshield defogging system (Ref. Fig. 3) blows flight station air over the inside of the two windshields and a portion of the left and right forward side windows. When the aircraft has been cold-soaked to -10 degrees F (-23.3 degrees C) or colder, the defogging fan switches should be ON. When the WINDOW DEFOG switchlight is depressed (Ref. Fig. 4), the ON light comes on and the defogging fan runs. The defogging fan aids the window heat control system to defog the windows.

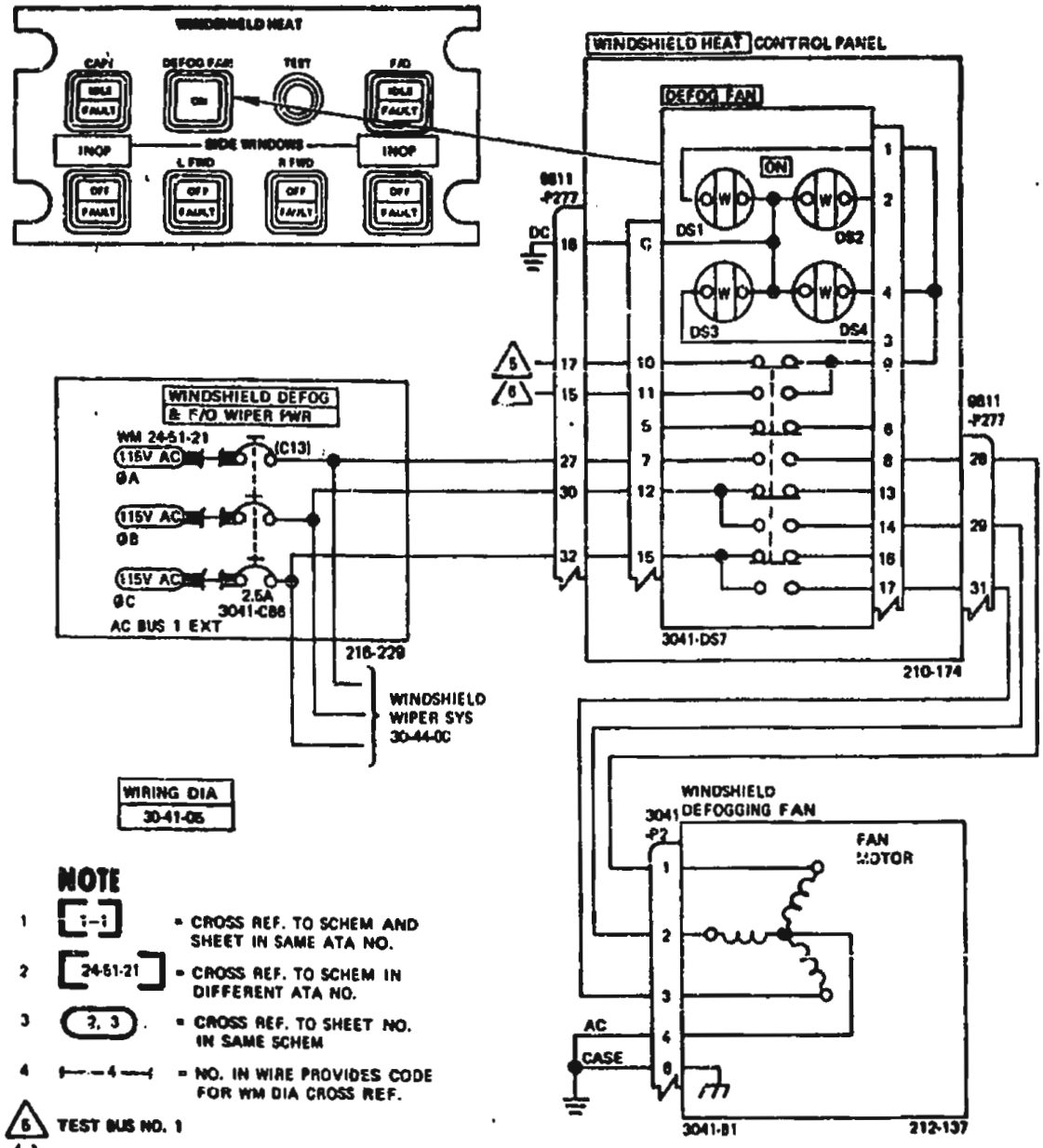
3. Windshield and Side Window Temperature Controllers

A. Description and Operation





R Windshield Defog Fan and Nozzle System
R Figure 3



NOTE

1. [1-1] = CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2. [24-61-21] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3. (2, 3) = CROSS REF. TO SHEET NO. IN SAME SCHEM
4. —4— = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.

5 TEST BUS NO. 1

6 DIM BUS NO. 1

7 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3041 UNLESS OTHERWISE NOTED

EM1-0000-30-8182

R Windshield Defog System Schematic
R Figure 4

R **NOTE:** The aft side window temperature controllers have been removed and the wiring deactivated.

The windshield and window temperature controllers are solid state units that use a digital logic system to maintain a constant windshield and side window temperature. Each of the two windshield heat controllers is a 6000-watt unit.
R Each of the two side window heat controllers is a 1500-watt unit.

The windshield temperature controllers are located in the forward electronic service center, zone 113.

On aircraft 001-025,
the side window temperature controllers are located outboard of the Flight Engineer/Second Officers console just above floor level, zone 215.

On aircraft 026-999,
the side window temperature controllers are on the aft end of the forward electrical equipment rack in the forward electronic service center, zone 112.

Protection is provided for the main windshields if both normal and overheat control circuits fail. This is accomplished by control of the RCCB by the windshield controller. If the windshield reaches 130 degrees F (54.4 degrees C) and power continues to be applied to the windshield, the RCCB is tripped open, thus deenergizing the windshield. A built-in test feature for the RCCB trip circuit is included in the controller. A push-button switch on the front of the controller, when pressed, simulates a 130 degrees F (54.4 degrees C) temperature at the windshield and causes the RCCB to open. The RCCB must be reset by cycling the WINDSHIELD PWR circuit breaker on the Flight Engineer/Second Officers overhead circuit breaker panel, CB2.

R WINDSHIELD TEMPERATURE CONTROL AND DEFOGGING SYSTEM
R FAULT ISOLATION

R 1. General

R WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM, WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18 AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

R Reference data and fault isolation procedures for troubleshooting Windshield Temperature Control and Defogging system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

R PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Windshield Temperature Control and Defogging system. It gives the area and access of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 is a list of all fault isolation data in this section of the manual.

Table 101

	FIGURE	TITLE
	101	Component Location Index
	102	Component Locator Diagram
	103	Captain or First Officer Windshield FAULT Light On
	104	Side Window FAULT Light On
	105	Windshield or Side Window FAULT Light Will Not Come On
R	SCHEM 1	Windshield Defog System Schematic
R	SCHEM 2	Windshield Temperature Control System Schematic
	SCHEM 3	Forward Side Window Temperature Control System Schematic
R	SCHEM 4	Aft Side Window Temperature Control System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BOX – INDICATOR LIGHTS CONTROL:			
ILCB CARD 1A12	1	FESC, AFT RH SIDE, FS 245/112AB	33–17–04
ILCB CARD 1A29	1	FESC, AFT RH SIDE, FS 245/112AB	33–17–04
CIRCUIT BREAKERS:			
LEFT WINDOW HEAT – SIDE WINDOWS – FWD PWR (3041-CB8)	1	FLT STA/CB2 (B12)	*
LEFT WINDOW HEAT – WINDSHIELD – CONT (3041-CB2)	1	FLT STA/CB2 (B15)	*
LEFT WINDOW HEAT – WINDSHIELD – PWR (3041-CB11)	1	FLT STA/CB2 (B16)	*
RIGHT WINDOW HEAT – SIDE WINDOWS – FWD CONT (3041-CB4)	1	FLT STA/CB2 (B20)	*
RIGHT WINDOW HEAT – SIDE WINDOWS – FWD PWR (3041-CB7)	1	FLT STA/CB2 (B21)	*
RIGHT WINDOW HEAT –WINDSHIELD– CONT (3041-CB1)	1	FLT STA/CB2 (B18)	*
RIGHT WINDOW HEAT – WINDSHIELD – PWR (3041-CB10)	1	FLT STA/CB2 (B19)	*
WINDSHIELD DEFOG & F/O WIPER PWR (3041-CB6)	1	FLT STA/CB2 (C13)	*
CONTROLLER – SIDE WINDOW TEMPERATURE, LEFT, FORWARD (3041-A2)	1	FESC, RIGHT EQUIP RACK/112AB	30–41–03
CONTROLLER – SIDE WINDOW TEMPERATURE, RIGHT, FORWARD (3041-A3)	1	FESC, RIGHT EQUIP RACK/112AB	30–41–03
CONTROLLER – WINDSHIELD TEMPERATURE, LEFT (3041-A5)	1	FESC, RIGHT EQUIP RACK/112AB	30–41–01
CONTROLLER –WINDSHIELD TEMPERATURE, RIGHT (3041-A6)	1	FESC, RIGHT EQUIP RACK/112AB	30–41–01
FAN – WINDSHIELD DEFOGGING	1	PRESS BLKHD PNLS/111BZ, 111CZ	30–41–07

*SEE WM EQUIPMENT LIST

MI-0000-30-5207

R
R

Component Location Index
Figure 101 (Sheet 1)

COMPONENT	QTY	AREA/ACCESS	REFERENCE
PANEL – WINDSHIELD HEAT	1	FLT STA, PILOT'S OVHD PNL/P5	30–41–99
RELAY – WINDSHIELD HEAT (3041-K1)	1	FESC, BOTTOM OF FWD RH ELECT RACK/112AB	
REMOTE CONTROL CIRCUIT BREAKERS:			
WINDSHIELD POWER, LEFT (3041-CB13)	1	MESC, FWD BLKHD LOWER CENTER/192K, 137AZ	20–24–03
WINDSHIELD POWER, RIGHT (3041-CB12)	1	MESC, FWD BLKHD LOWER CENTER/192K, 137AZ	20–24–03
SWITCH – WINDSHIELD HEAT TEST (3041-S1)	1	FLT STA, PILOT'S OVHD PNL/P5	30–41–11
SWITCHLIGHTS:			
DEFOG FAN (3041-DS7)	1	FLT STA, PILOT'S OVHD PNL/P5	20–33–01
SIDE WINDOWS, LEFT FWD (3041-DS4)	1	FLT STA, PILOT'S OVHD PNL/P5	20–33–01
SIDE WINDOWS, RIGHT FWD (3041-DS5)	1	FLT STA, PILOT'S OVHD PNL/P5	20–33–01
WINDSHIELD HEAT (CAPT) (3041-DS2)	1	FLT STA, PILOT'S OVHD PNL/P5	20–33–01
WINDSHIELD HEAT (F/O) (3041-DS1)	1	FLT STA, PILOT'S OVHD PNL/P5	20–33–01

*SEE WM EQUIPMENT LIST

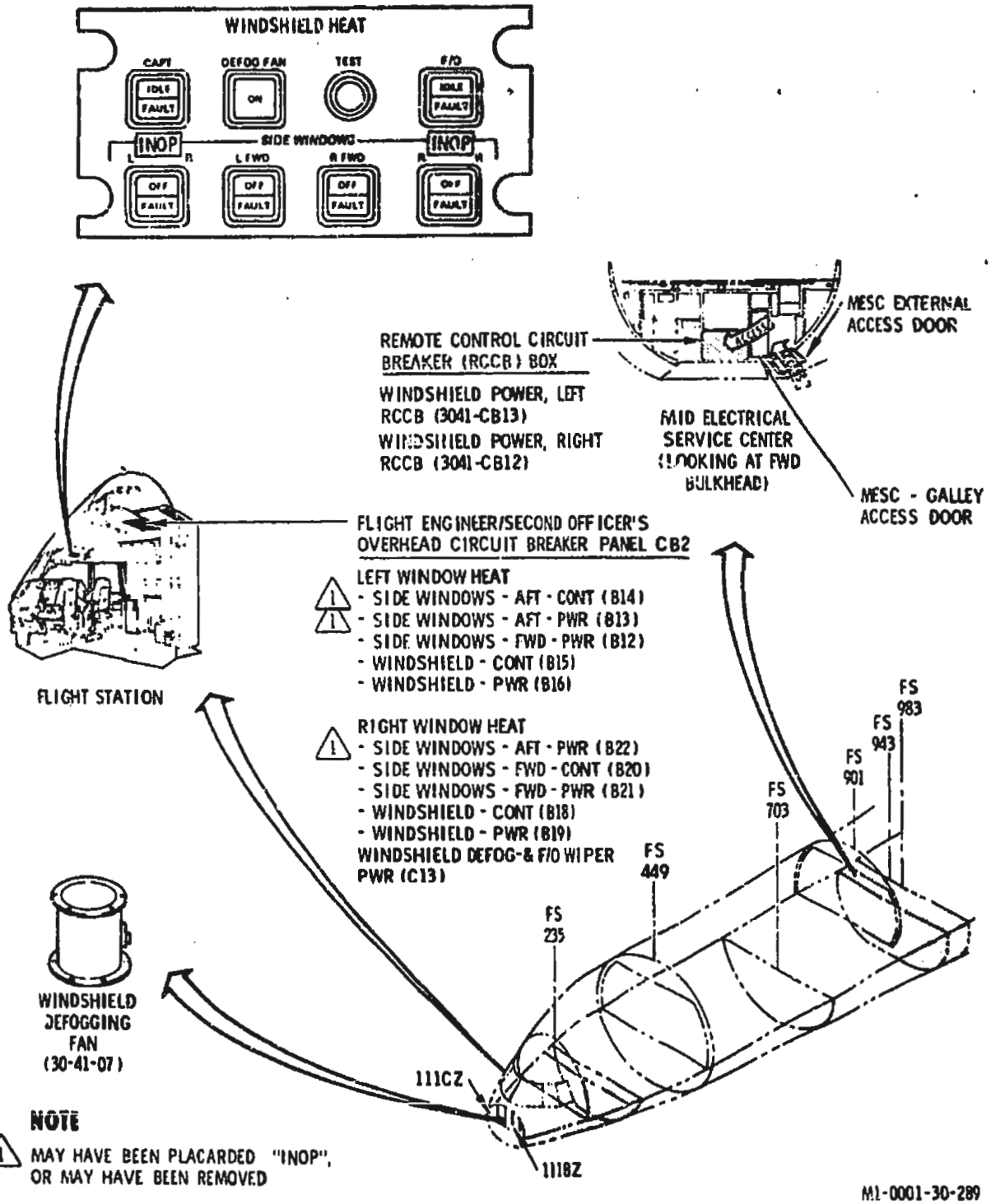
M1-0000-30-5288

R
R

Component Location Index
Figure 101 (Sheet 2)

EFFECTIVITY: ALL

001B



R
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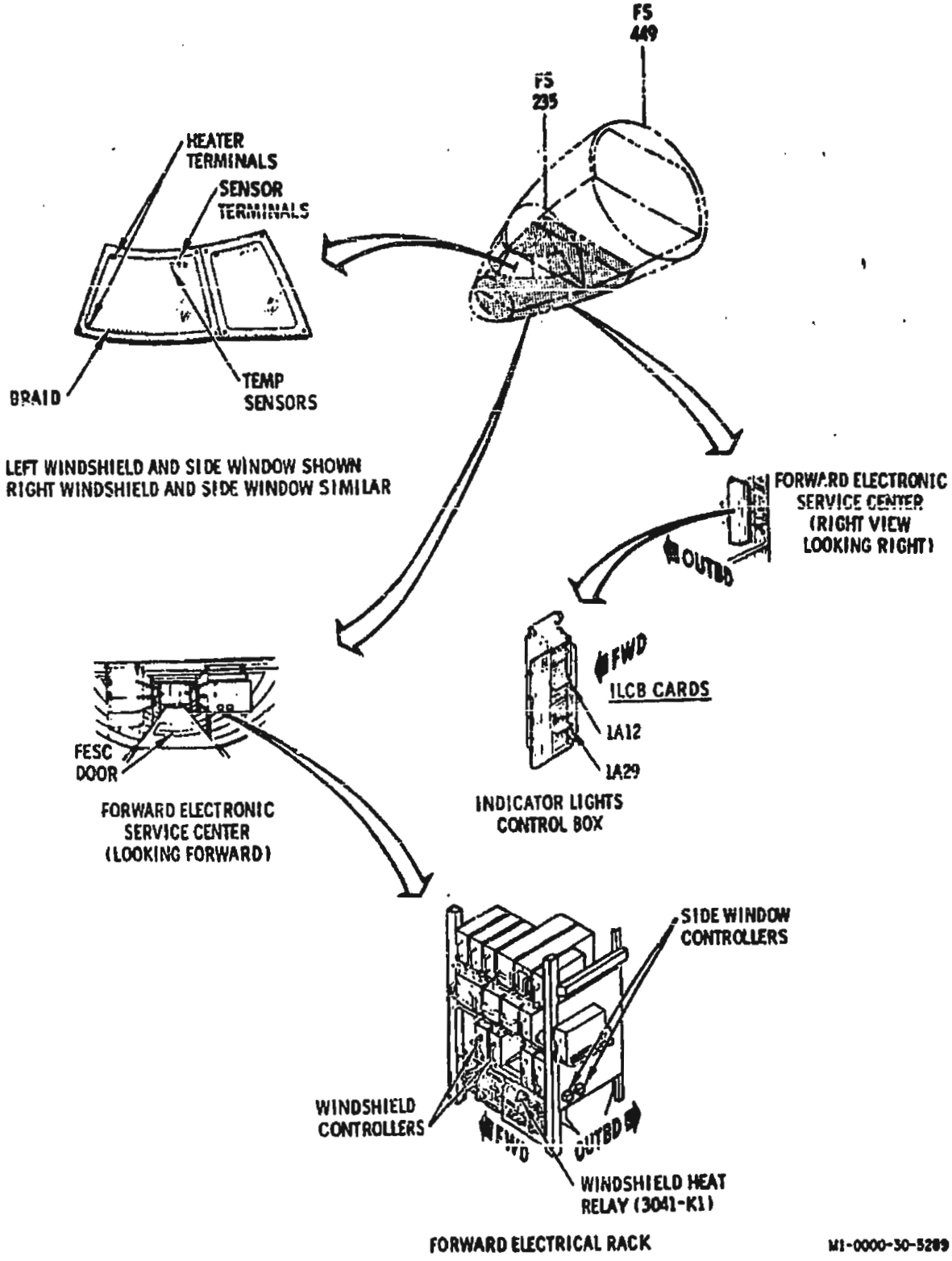
Component Locator Diagram
Figure 102 (Sheet 1)

EFFECTIVITY: ALL

001B



R
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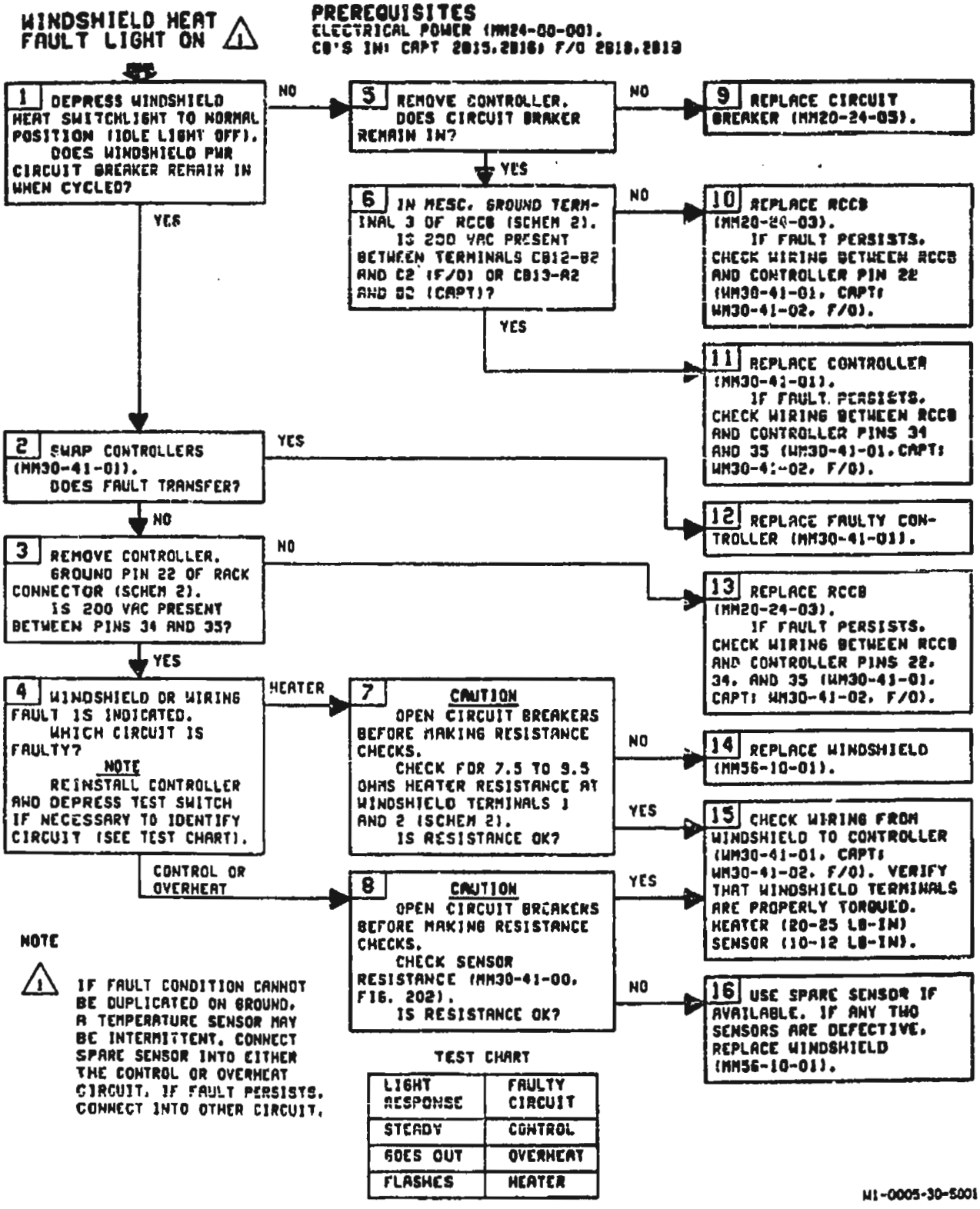
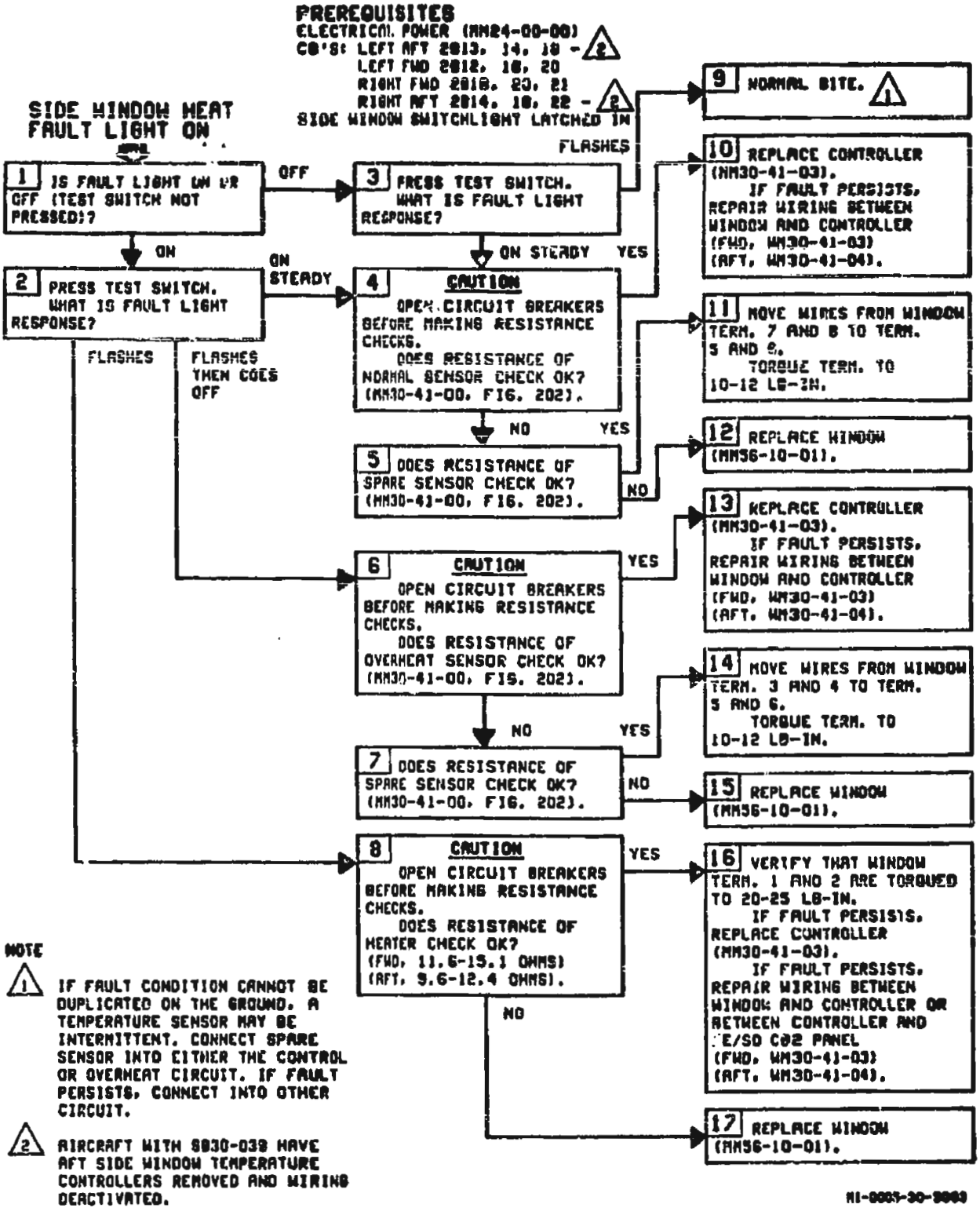
Component Locator Diagram
Figure 102 (Sheet 2)

EFFECTIVITY: ALL

001B


WINDSHIELD HEAT FAULT LIGHT ON
PREREQUISITES
ELECTRICAL POWER (MM24-00-00).
CB'S IN: CAPT 2B15,2B16; F/O 2B18,2B19
1 DEPRESS WINDSHIELD HEAT SWITCHLIGHT TO NORMAL POSITION (IDLE LIGHT OFF). DOES WINDSHIELD PWR CIRCUIT BREAKER REMAIN IN WHEN CYCLED?
NO
YES
2 SWAP CONTROLLERS (MM30-41-01). DOES FAULT TRANSFER?
YES
NO
3 REMOVE CONTROLLER. GROUND PIN 22 OF RACK CONNECTOR (SCHEM 2). IS 200 VAC PRESENT BETWEEN PINS 34 AND 35?
NO
YES
4 WINDSHIELD OR WIRING FAULT IS INDICATED. WHICH CIRCUIT IS FAULTY?
NOTE
REINSTALL CONTROLLER AND DEPRESS TEST SWITCH IF NECESSARY TO IDENTIFY CIRCUIT (SEE TEST CHART).
HEATER
CONTROL OR OVERHEAT
5 REMOVE CONTROLLER. DOES CIRCUIT BREAKER REMAIN IN?
NO
YES
9 REPLACE CIRCUIT BREAKER (MM20-24-05).
6 IN MISC. GROUND TERMINAL 3 OF RCCB (SCHEM 2). IS 200 VAC PRESENT BETWEEN TERMINALS CB12-B2 AND C2 (F/O) OR CB13-A2 AND B2 (CAPT)?
NO
YES
10 REPLACE RCCB (MM20-24-03). IF FAULT PERSISTS, CHECK WIRING BETWEEN RCCB AND CONTROLLER PIN 22 (MM30-41-01, CAPT; MM30-41-02, F/O).
11 REPLACE CONTROLLER (MM30-41-01). IF FAULT PERSISTS, CHECK WIRING BETWEEN RCCB AND CONTROLLER PINS 34 AND 35 (MM30-41-01, CAPT; MM30-41-02, F/O).
12 REPLACE FAULTY CONTROLLER (MM30-41-01).
13 REPLACE RCCB (MM20-24-03). IF FAULT PERSISTS, CHECK WIRING BETWEEN RCCB AND CONTROLLER PINS 22, 34, AND 35 (MM30-41-01, CAPT; MM30-41-02, F/O).
7 CAUTION
OPEN CIRCUIT BREAKERS BEFORE MAKING RESISTANCE CHECKS.
CHECK FOR 7.5 TO 9.5 OHMS HEATER RESISTANCE AT WINDSHIELD TERMINALS 1 AND 2 (SCHEM 2).
IS RESISTANCE OK?
NO
YES
14 REPLACE WINDSHIELD (MM56-10-01).
15 CHECK WIRING FROM WINDSHIELD TO CONTROLLER (MM30-41-01, CAPT; MM30-41-02, F/O). VERIFY THAT WINDSHIELD TERMINALS ARE PROPERLY TORQUED. HEATER (20-25 LB-IN) SENSOR (10-12 LB-IN).
8 CAUTION
OPEN CIRCUIT BREAKERS BEFORE MAKING RESISTANCE CHECKS.
CHECK SENSOR RESISTANCE (MM30-41-00, FIG. 202).
IS RESISTANCE OK?
YES
NO
16 USE SPARE SENSOR IF AVAILABLE. IF ANY TWO SENSORS ARE DEFECTIVE, REPLACE WINDSHIELD (MM56-10-01).
NOTE
IF FAULT CONDITION CANNOT BE DUPLICATED ON GROUND, A TEMPERATURE SENSOR MAY BE INTERMITTENT. CONNECT SPARE SENSOR INTO EITHER THE CONTROL OR OVERHEAT CIRCUIT. IF FAULT PERSISTS, CONNECT INTO OTHER CIRCUIT.
TEST CHART
LIGHT RESPONSE | FAULTY CIRCUIT
STEADY | CONTROL
GOES OUT | OVERHEAT
FLASHES | HEATER
MI-0005-30-5001

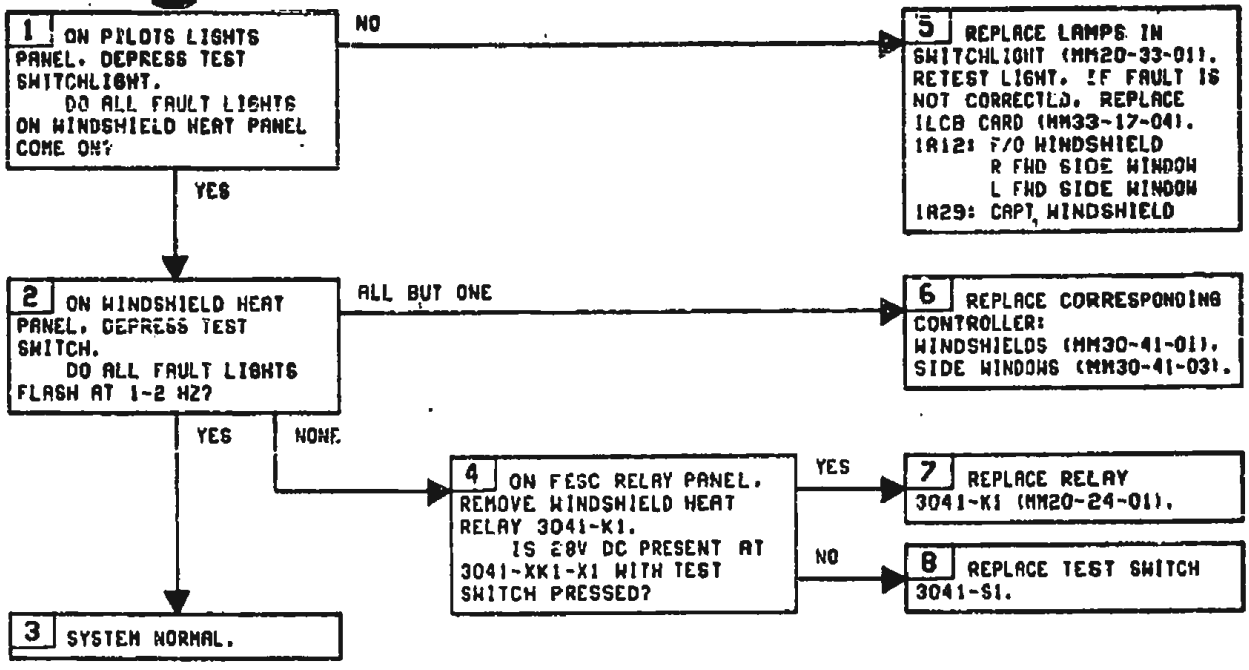
R Windshield Heat FAULT Light On
R Figure 103


PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S: LEFT AFT 2813, 14, 18 - 2
LEFT FWD 2812, 18, 20
RIGHT FWD 2818, 20, 21
RIGHT AFT 2814, 18, 22 - 2
SIDE WINDOW SWITCHLIGHT LATCHED IN
SIDE WINDOW HEAT FAULT LIGHT ON
1 IS FAULT LIGHT ON OR OFF (TEST SWITCH NOT PRESSED)?
OFF
ON
2 PRESS TEST SWITCH. WHAT IS FAULT LIGHT RESPONSE?
ON STEADY
FLASHES
FLASHES THEN GOES OFF
3 PRESS TEST SWITCH. WHAT IS FAULT LIGHT RESPONSE?
FLASHES
ON STEADY
YES
4 CAUTION
OPEN CIRCUIT BREAKERS BEFORE MAKING RESISTANCE CHECKS.
DOES RESISTANCE OF NORMAL SENSOR CHECK OK? (MM30-41-00, FIG. 202).
NO
YES
5 DOES RESISTANCE OF SPARE SENSOR CHECK OK? (MM30-41-00, FIG. 202).
NO
6 CAUTION
OPEN CIRCUIT BREAKERS BEFORE MAKING RESISTANCE CHECKS.
DOES RESISTANCE OF OVERHEAT SENSOR CHECK OK? (MM30-41-00, FIG. 202).
YES
NO
7 DOES RESISTANCE OF SPARE SENSOR CHECK OK? (MM30-41-00, FIG. 202).
YES
NO
8 CAUTION
OPEN CIRCUIT BREAKERS BEFORE MAKING RESISTANCE CHECKS.
DOES RESISTANCE OF HEATER CHECK OK? (FWD, 11.6-15.1 OHMS) (AFT, 9.6-12.4 OHMS).
YES
NO
9 NORMAL BITE. 1
10 REPLACE CONTROLLER (MM30-41-03).
IF FAULT PERSISTS, REPAIR WIRING BETWEEN WINDOW AND CONTROLLER (FWD, MM30-41-03) (AFT, MM30-41-04).
11 MOVE WIRES FROM WINDOW TERM. 7 AND 8 TO TERM. 5 AND 6.
TORQUE TERM. TO 10-12 LB-IN.
12 REPLACE WINDOW (MM56-10-01).
13 REPLACE CONTROLLER (MM30-41-03).
IF FAULT PERSISTS, REPAIR WIRING BETWEEN WINDOW AND CONTROLLER (FWD, MM30-41-03) (AFT, MM30-41-04).
14 MOVE WIRES FROM WINDOW TERM. 3 AND 4 TO TERM. 5 AND 6.
TORQUE TERM. TO 10-12 LB-IN.
15 REPLACE WINDOW (MM56-10-01).
16 VERIFY THAT WINDOW TERM. 1 AND 2 ARE TORQUED TO 20-25 LB-IN.
IF FAULT PERSISTS, REPLACE CONTROLLER (MM30-41-03).
IF FAULT PERSISTS, REPAIR WIRING BETWEEN WINDOW AND CONTROLLER OR BETWEEN CONTROLLER AND E/SD C02 PANEL (FWD, MM30-41-03) (AFT, MM30-41-04).
17 REPLACE WINDOW (MM56-10-01).
NOTE
1 IF FAULT CONDITION CANNOT BE DUPLICATED ON THE GROUND, A TEMPERATURE SENSOR MAY BE INTERMITTENT. CONNECT SPARE SENSOR INTO EITHER THE CONTROL OR OVERHEAT CIRCUIT. IF FAULT PERSISTS, CONNECT INTO OTHER CIRCUIT.
2 AIRCRAFT WITH SB30-039 HAVE AFT SIDE WINDOW TEMPERATURE CONTROLLERS REMOVED AND WIRING DEACTIVATED.

R Side Window Heat FAULT Light On
R Figure 104

PREREQUISITES
ELECTRICAL POWER (MM24-00-00).
CB'S IN: CB1-L9
CB2-B12, B15, B16, B18, B19, B20
B21, H8, H9, H10, J2, J4
CAPT AND F/O SWITCHLIGHTS OUT
SIDE WINDOWS SWITCHLIGHTS IN (2)

WINDSHIELD OR SIDE WINDOW HEAT FAULT LIGHT WILL NOT COME ON

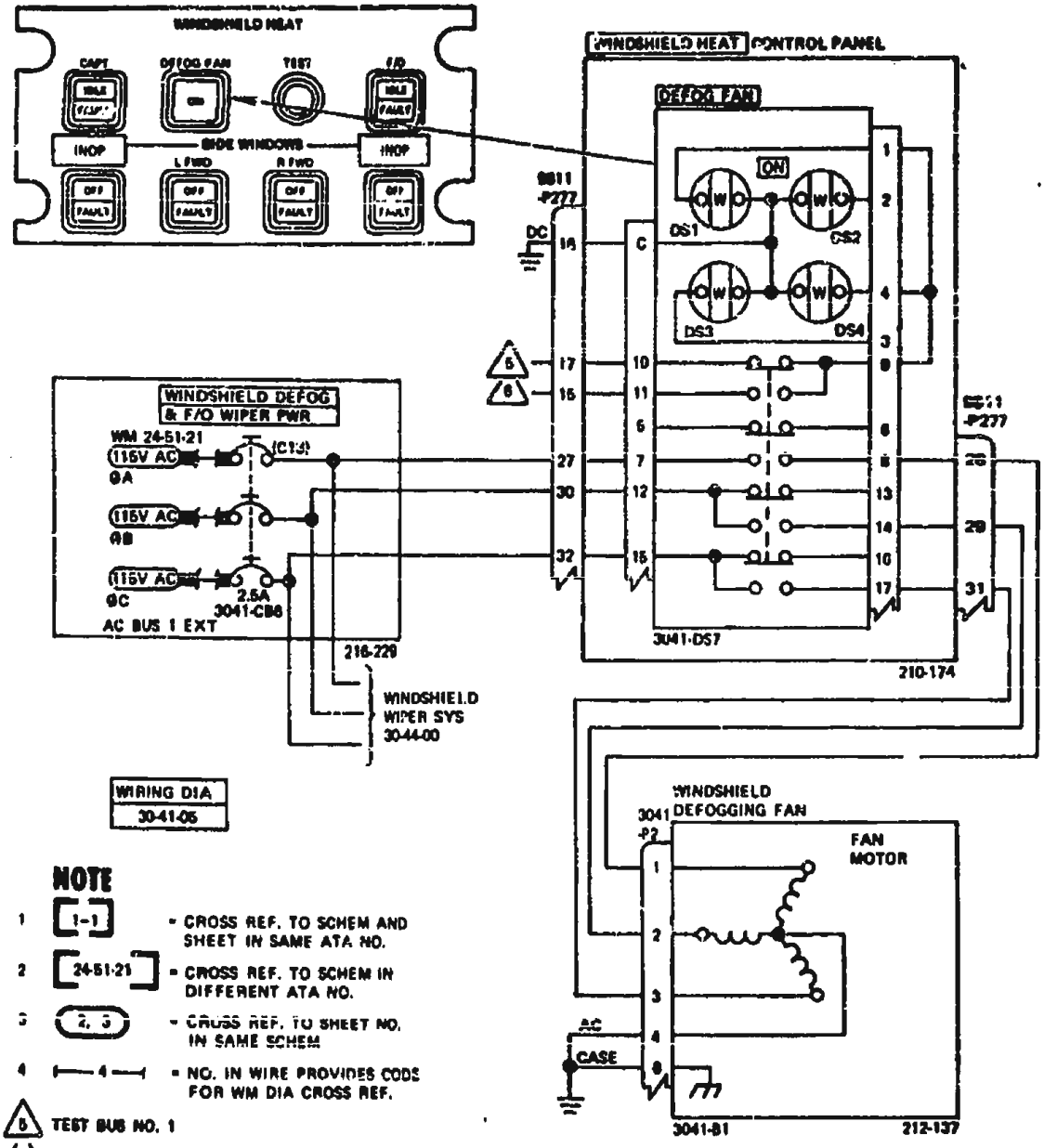

1 ON PILOTS LIGHTS PANEL, DEPRESS TEST SWITCHLIGHT.
DO ALL FAULT LIGHTS ON WINDSHIELD HEAT PANEL COME ON?
NO
YES
5 REPLACE LAMPS IN SWITCHLIGHT (MM20-33-01). RETEST LIGHT. IF FAULT IS NOT CORRECTED, REPLACE ILCB CARD (MM33-17-04).
1A12: F/O WINDSHIELD
R FWD SIDE WINDOW
L FWD SIDE WINDOW
1A29: CAPT WINDSHIELD
2 ON WINDSHIELD HEAT PANEL, DEPRESS TEST SWITCH.
DO ALL FAULT LIGHTS FLASH AT 1-2 HZ?
ALL BUT ONE
6 REPLACE CORRESPONDING CONTROLLER:
WINDSHIELDS (MM30-41-01),
SIDE WINDOWS (MM30-41-03).
YES
NONE
4 ON FESC RELAY PANEL, REMOVE WINDSHIELD HEAT RELAY 3041-K1.
IS 28V DC PRESENT AT 3041-XK1-X1 WITH TEST SWITCH PRESSED?
YES
7 REPLACE RELAY 3041-K1 (MM20-24-01).
NO
8 REPLACE TEST SWITCH 3041-S1.
3 SYSTEM NORMAL.

NOTE
1 ALL VOLTAGES MEASURED TO GROUND

(2) AFT SIDE WINDOW HEAT INOP

M1-C30B-30-5011

R Windshield or Side Window Heat FAULT Light Will Not Come On
R Figure 105



NOTE

1. [1-1] - CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2. [24-51-21] - CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3. (2, 3) - CROSS REF. TO SHEET NO. IN SAME SCHEM
4. —4— - NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.

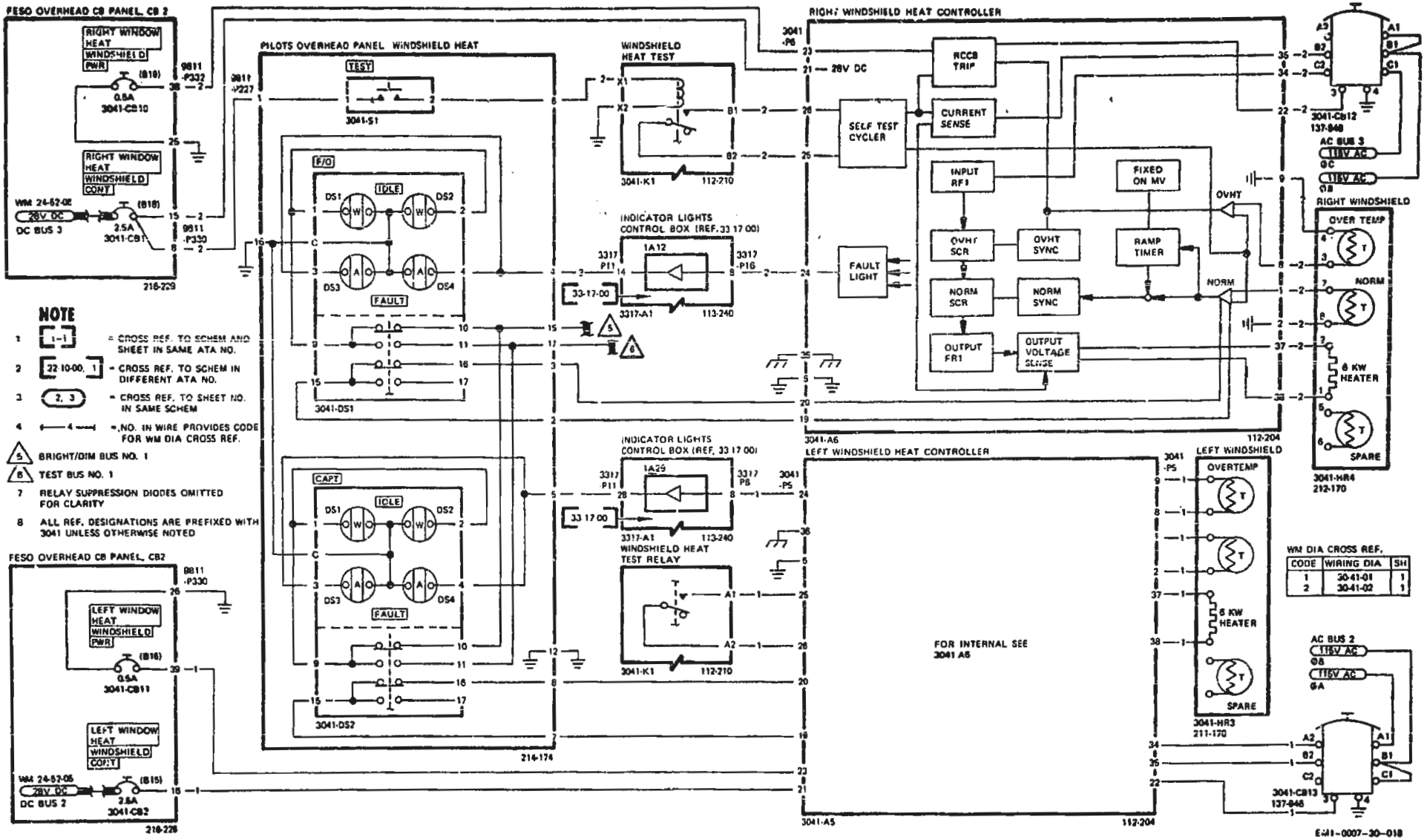
5. TEST BUS NO. 1
6. DIM BUS NO. 1
7. ALL REF. DESIGNATIONS ARE PREFIXED WITH 3041 UNLESS OTHERWISE NOTED

EM1-0000-30-0102

R Windshield Defog System Schematic
R SCHEM 1

EFFECTIVITY: ALL

001B



NOTE

1. [1-1] = CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2. [22 10-00, 1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3. (2, 3) = CROSS REF. TO SHEET NO. IN SAME SCHEM
4. ⟵4⟶ = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5. BRIGHT/DIM BUS NO. 1
6. TEST BUS NO. 1
7. RELAY SUPPRESSION DIODES OMITTED FOR CLARITY
8. ALL REF. DESIGNATIONS ARE PREFIXED WITH 3041 UNLESS OTHERWISE NOTED

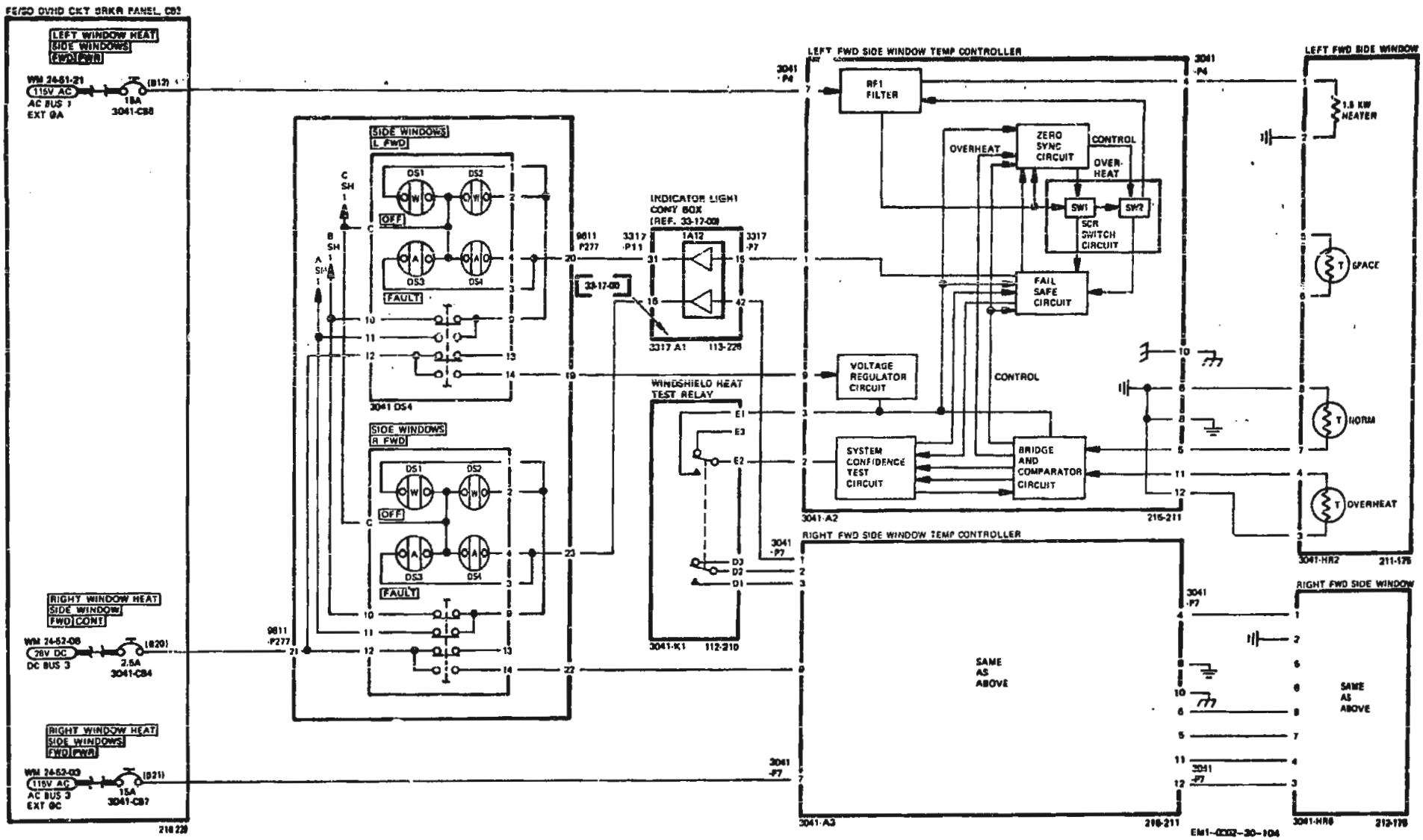
WM DIA CROSS REF.

CODE	WIRING DIA	SH
1	30-41-01	1
2	30-41-02	1

R Windshield Temperature Control System Schematic
R SCHEM 2

EFFECTIVITY: ALL

0018



Forward Side Window Temperature Control System Schematic
SCHEM 3

WINDSHIELD TEMPERATURE CONTROL AND DEFOGGING SYSTEM MAINTENANCE PRACTICES

R NOTE: The aft side window temperature controllers have been
R removed and the wiring deactivated.

1. General

Maintenance practices for this system include resistance checks of the windshield temperature control sensors and heater elements and a system deactivation procedure.

R Three identical temperature control sensors and a heater element are incorporated in each main windshield and both forward side windows. Two of the sensors function in control circuits, one for normal mode temperature control and one for overheat mode temperature control. The third sensor is used as a spare in case of a malfunction of one of the other sensors. All three sensors are completely interchangeable with each other. If a fault exists, the spare sensor should be interchanged with one of the other sensors. To correct a malfunction condition, if this action fails, exchange the spare sensor with the last remaining sensor. If the fault persists, refer to the fault isolation procedures (Ref. 30-41-00, 101).

2. Equipment and Materials

Ohmmeter, Simpson, Model 260, or equivalent

3. Referenced Procedures

30-41-00 Windshield Temperature Control and Defogging System - Adjustment and Test

56-10-01 Windshields - Removal and Installation

4. Maintenance Practices

A. Temperature Control Sensor Resistance Check

(1) On Flight Engineer/Second Officers overhead circuit breaker panel (CB2), zone 215, open and tag circuit breakers for applicable temperature control system as specified in Table 201.

Circuit Breakers
Table 201

	TEMPERATURE CONTROL SYSTEM	CIRCUIT BREAKER
	Left Forward Side Window	Left Window Heat Side Windows Fwd Pwr (B12)
		Right Window Heat Side Windows Fwd Cont (B20)
	Left Windshield	Left Window Heat Windshield Cont (B15)
R		Left Window Heat Windshield Pwr (B16)
	Right Forward Side Window	Right Window Heat Side Windows Fwd Pwr (B21)
		Right Window Heat Side Windows Fwd Cont (B20)
	Right Windshield	Right Window Heat Windshield Cont (B18)
		Right Window Heat Windshield Pwr (B19)

(2) Identify electrical wires and disconnect from sensor terminals on windshield (Ref. Fig. 201).

CAUTION: DO NOT EXCEED 0.005 WATT POWER INPUT TO TEMPERATURE SENSORS.

(3) Set ohmmeter resistance multiplier selector to X100.

(4) Connect ohmmeter leads to sensor terminals.

(5) Verify that sensor resistance is as shown in Figure 202.

(6) Repeat Steps 4A(4) and 4A(5) at remaining sensors.

(7) Remove ohmmeter leads from sensor terminals.

(8) Connect electrical wires, as identified in Step 4A(2), to any two sensors whose resistance is within specified tolerances. For consistency, use spare only if one of the other sensors is defective or has a resistance with a larger deviation from normal. Torque terminal screws 10 to 12 lb in.

(9) If the resistance of more than one sensor is out of tolerance, replace windshield (Ref. 56-10-01).

(10) Remove tags and close circuit breakers opened in Step 4A(1).

(11) Verify operation of temperature control system (Ref. 30-41-00).

B. Heater Element Resistance Check

(1) On Flight Engineer/Second Officers overhead circuit breaker panel (CB2), zone 215, open and tag circuit breakers for applicable temperature control system as specified in Table 201.

(2) Disconnect electrical wires from heater terminals on windshield (Ref. Fig. 201).

(3) Set ohmmeter resistance multiplier selector to X1.

(4) Connect ohmmeter leads to heater terminals.

(5) Verify that heater resistance is between 7.5 and 9.5 ohms for main windshields, and between 11.6 and 15.1 ohms for the forward side windows.

(6) Remove ohmmeter leads from heater terminals.

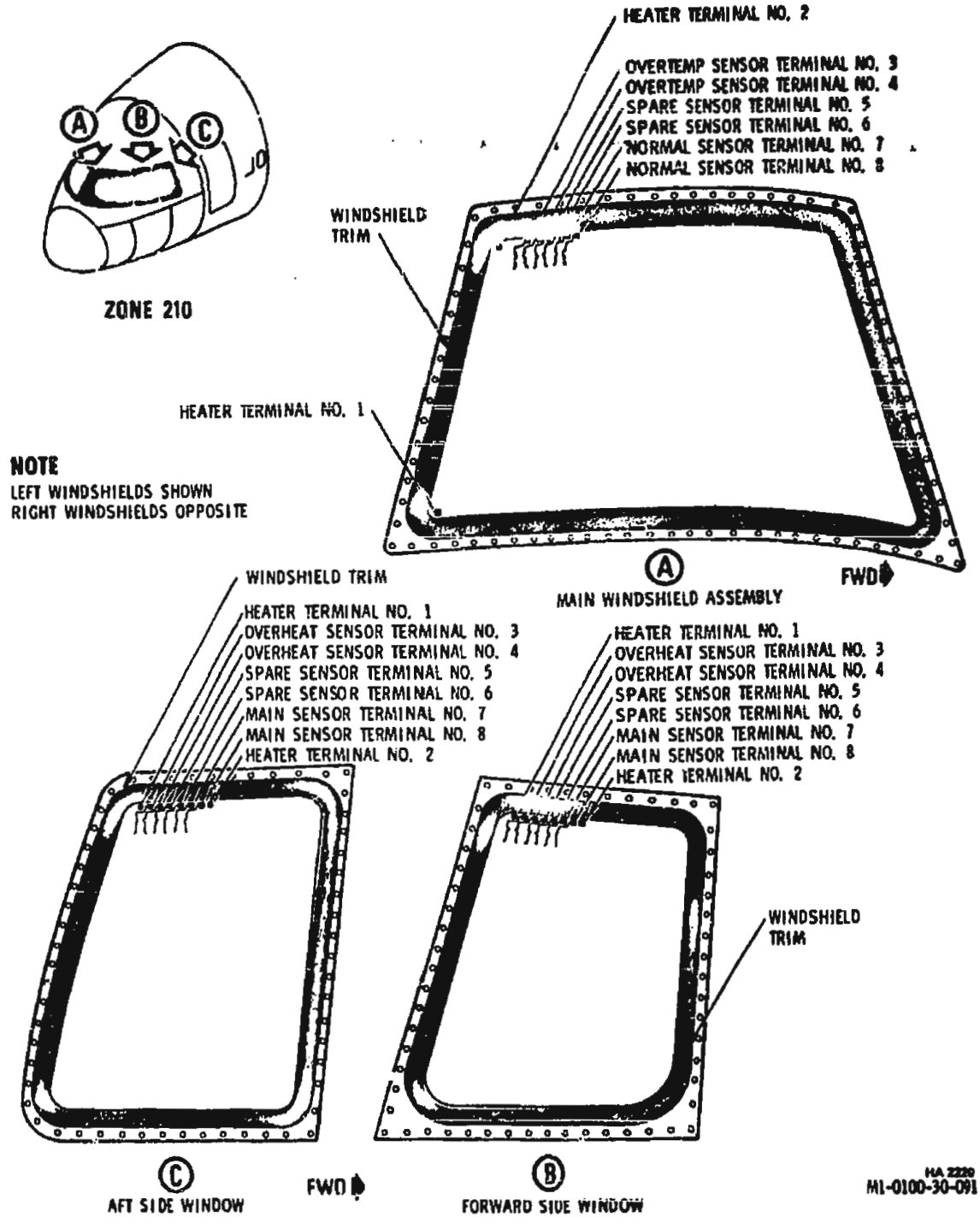
(7) If heater element resistance is within values specified in Step 4B(5), connect electrical wires disconnected in Step 4B(2). Torque terminal screws 20 to 25 lb in.

(8) If heater element resistance is not within specified tolerance, replace windshield (Ref. 56-10-01).

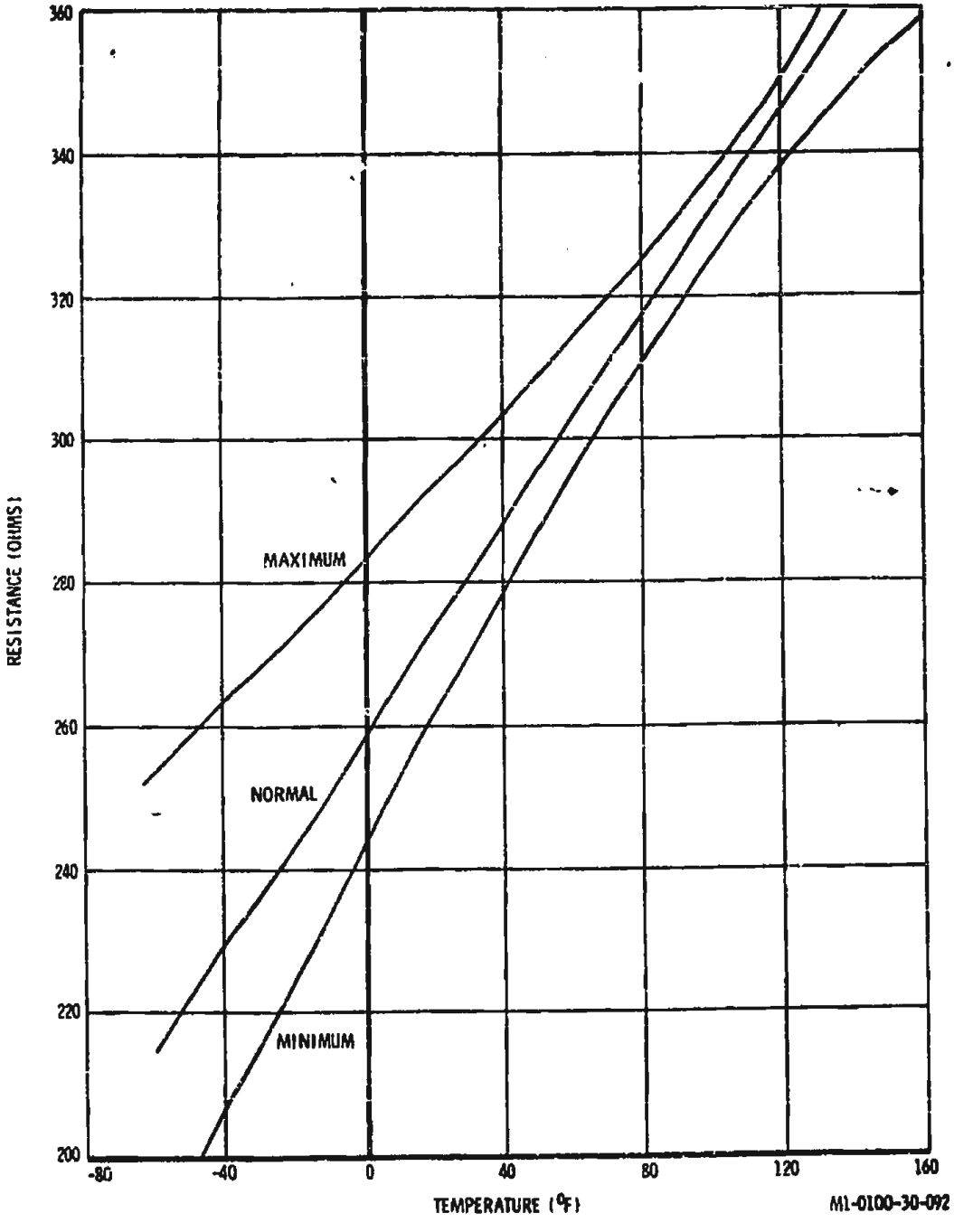
(9) Remove tags and close circuit breakers opened in Step 4B(1).

(10) Verify operation of temperature control system (Ref. 30-41-00).

C. Deactivation



Temperature Sensor and Heat Element Terminal Locations
Figure 201



Temperature Sensor Resistance
Figure 202

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL (30-41-01 Windshield Heat System).

(1) On Flight Engineer/Second Officers overhead circuit breaker panel (CB2), Zone 215, open and collar applicable circuit breaker RIGHT WINDOW HEAT - WINDSHIELD - PWR (B19) or LEFT WINDOW HEAT - WINDSHIELD - PWR (B16).

(2) RCCB's mounted on the forward wall of mid electrical service center, zone 137, may be manufactured with a manual trip switch. If the RCCB's are so equipped, manually deactivate right windshield RCCB 3041-CB12 or left windshield RCCB 3041-CB13.

(3) On pilots overhead control panel, zone 210, placard applicable WINDSHIELD HEAT switchlight "SYSTEM INOPERATIVE".

(4) Make appropriate entry in aircraft log book.

WINDSHIELD TEMPERATURE CONTROL AND DEFOGGING SYSTEM ADJUSTMENT AND TEST

R NOTE: The aft side window temperature controllers have been removed and the wiring deactivated.

1. Referenced Procedure

24-41-00 External Power/Ground Service System - Maintenance Practices

2. Adjustment/Test

A. BITE Test

(1) Turn on electrical power (Ref. 24-41-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that the following circuit breakers are closed:

LEFT WINDOW HEAT - SIDE WINDOW

R FWD PWR (B12)

LEFT WINDOW HEAT - WINDSHIELD

CONT (B15)

PWR (B16)

RIGHT WINDOW HEAT - SIDE WINDOWS

FWD CONT (B20)

R FWD PWR (B21)

RIGHT WINDOW HEAT - WINDSHIELD

CONT (B18)

PWR (B19)

WINDSHIELD DEFOG & F/O WIPER PWR (C13)

(3) Test controller power circuit.

(a) In forward electronic service center, depress and hold RCCB TEST switch on each controller for five seconds.

NOTE: Windshield CBs must be open and close in the proper sequence to reset the remote controlled circuit breaker (RCCB) if it was tripped by the window heat control system.

(b) Verify that circuit breakers, WINDSHIELD PWR (B16) and (B19) have opened.

(c) Open circuit breakers, WINDSHIELD CONT (B15) and (B18).

(d) Close circuit breakers, WINDSHIELD PWR (B16) and (B19) and RCCB.

(e) Close circuit breakers, WINDSHIELD CONT (B15) and (B18).

R (4) On WINDSHIELD HEAT panel, located on pilots overhead panel, zone 210, press L & R FWD side window heat switches to on position (in) and depress TEST pushbutton switch. Check that fault lights on CAPT, F/O, L FWD & R FWD heat switches cycle on and off while the TEST pushbutton is held depressed.

NOTE: The two (Capt and First Officers) windshield heat switches may be on or off for this test.

R (5) Turn both FWD side window heat switches to off (out) position and CAPTAINS and FIRST OFFICERS windshield heat switches to IDLE (out).

(6) Depress DEFOG FAN switch. Check that ON light comes on and that air is blown onto windshields from both windshield defog louvers.

(7) Depress DEFOG FAN switch to turn off defog fan.

(8) Turn off electrical power (Ref. 24-41-00).

FRONT WINDSHIELD TEMPERATURE CONTROLLER REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for the left and right windshield temperature controllers. The temperature controllers are located in the forward electronic service center, zone 113, on the electrical equipment rack. Access is through access door 112AB. Referenced circuit breakers are different for the left and right temperature controllers. Only the circuit breakers associated with the temperature controller to be removed require opening.

2. Referenced Procedure

20-23-02 Rack Mounted ARINC Box Lever Latch - Maintenance Practices

30-41-00 Windshield Temperature Control and Defogging System - Adjustment and Test

3. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag the following circuit breakers:

LEFT WINDOW HEAT - WINDSHIELD - CONT (B15)

LEFT WINDOW HEAT - WINDSHIELD - PWR (B16)

RIGHT WINDOW HEAT - WINDSHIELD - CONT (B18)

RIGHT WINDOW HEAT - WINDSHIELD - PWR (B19)

(2) Open access door 112AB to gain access to forward electronic service center.

(3) Locate temperature controller on bottom shelf of electrical equipment rack, disengage holddown extractors, and remove temperature controller.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Slide temperature controller into electrical equipment rack.

(3) Engage latch (Ref. 20-23-02) and secure temperature controller.

(4) Close and secure access door.

(5) Remove tags and close circuit breakers opened in Step 3A(1).

(6) Test windshield temperature control and defogging system (Ref. 30-41-00).

SIDE WINDOW TEMPERATURE CONTROLLER - REMOVAL AND INSTALLATION

R NOTE: The aft side window temperature controllers have been removed and the wiring deactivated.

1. General

The following removal and installation procedure is applicable for the left and right side window temperature controllers.

On aircraft 001-025, the controllers are located outboard of the Flight Engineer/Second Officer console kickpanel, zone 215, and are accessible by removing the kickpanel or the air curtain on the forward outboard edge of the console.

On aircraft 026-999, the controllers are on the aft end of the forward electrical equipment rack in the forward electronic service center, zone 112.

Referenced circuit breakers are different for the left and right temperature controllers. Only the circuit breakers associated with the temperature controller to be removed require opening.

2. Referenced Procedure

30-41-00 Windshield Temperature Control and Defogging System - Adjustment and Test

3. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag the following circuit breakers:

LEFT WINDOW HEAT - SIDE WINDOWS - FWD - PWR (B12),

R LEFT WINDOW HEAT - SIDE WINDOWS - FWD - CONT (B20),

R RIGHT WINDOW HEAT - SIDE WINDOWS - FWD - PWR
R (B21),

R RIGHT WINDOW HEAT - SIDE WINDOWS - FWD - CONT
R (B20).

CAUTION: ON AIRCRAFT 001-025, THERE IS NO FLOOR OUTBOARD OF THE FLIGHT ENGINEER/SECOND OFFICERS STATION. DO NOT ALLOW ANY OBJECT TO FALL THROUGH THE OPENING.

(2) On aircraft 001-025, gain access to the area outboard of the Flight Engineer/Second Officer station and locate temperature controller (Ref. Fig. 401).

(2) On aircraft 026-999, locate temperature controller on the aft end of the forward electrical equipment rack in the forward electronic service center (FESC).

(3) Disconnect electrical connector from temperature controller.

(4) Remove attaching screws and remove temperature controller.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Install temperature controller and secure with attaching screws.

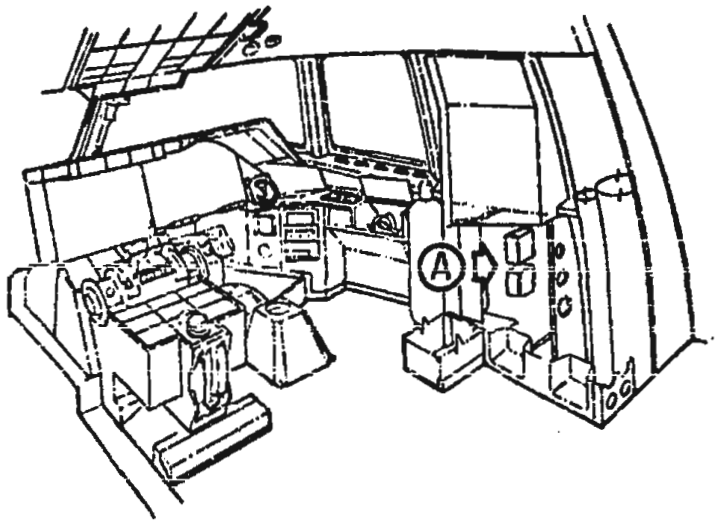
(3) Connect electrical connector to controller.

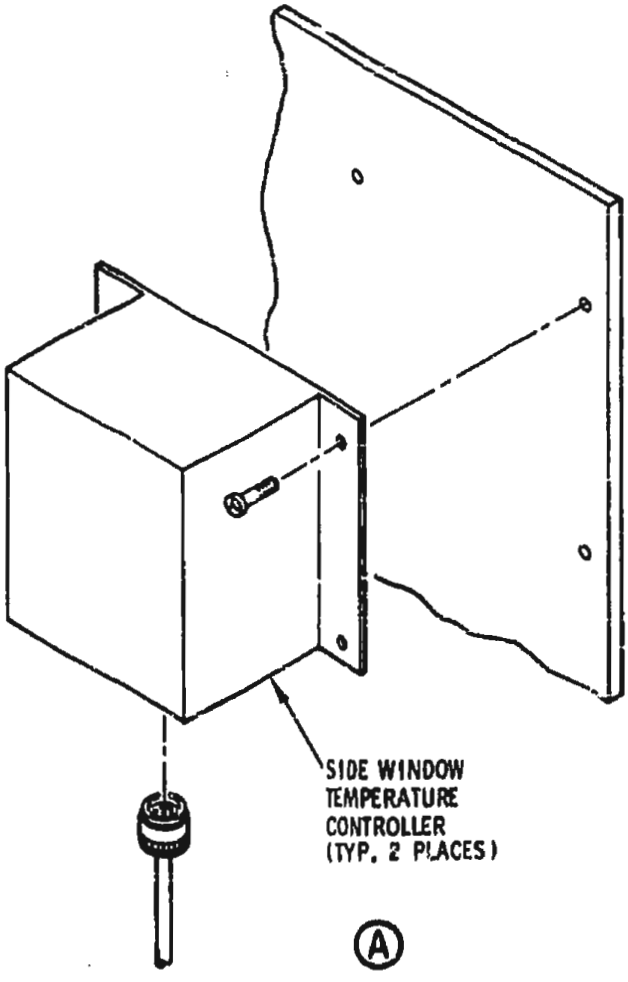
(4) Remove tags and close circuit breakers opened in Step 3A(1).

(5) Verify operation of windshield temperature control system (Ref. 30-41-00).

(6) On aircraft 001-025, replace kick-panel or air curtain, as applicable.

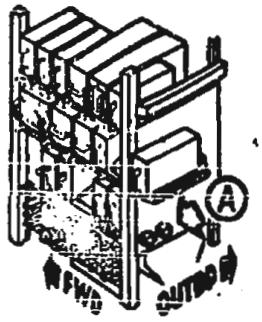
On aircraft 026-999, close and secure forward electronic service center door.



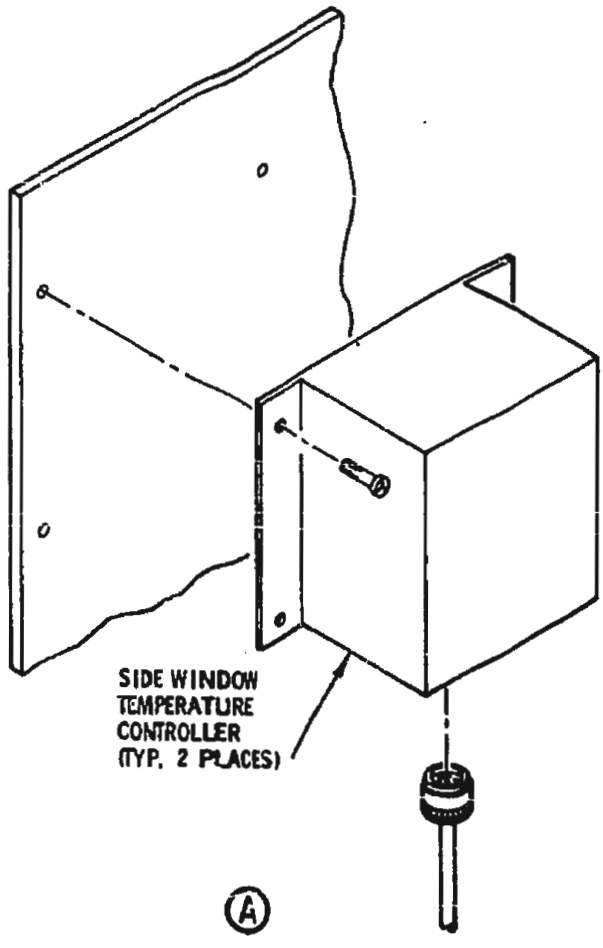


HH 9515
M1-0000-30-5285

R Side Window Temperature Controllers
R Removal and Installation
R Figure 401



FORWARD ELECTRICAL RACK
FORWARD ELECTRONCI SERVICE CENTER
RIGHT SIDE



MI-0000-30-282

R Side Window Temperature Controllers
R Removal and Installation
R Figure 401

On aircraft 026-999,
close and secure forward electronic service center door.

WINDSHIELD DEFOGGING FAN - REMOVAL AND INSTALLATION

1. Equipment and Materials

Protective caps

2. Referenced Procedures

30-41-00 Windshield Temperature Control and Defogging System - Adjustment and Test

53-11-51 FS 128 Bulkhead - Removal and Installation

3. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers WINDSHIELD DEFOG and F/O WIPER PWR (C13).

R

(2) Open radome, zone 111.

(3) Remove left and right access panels from pressurized bulkhead (Ref. 53-11-51).

(4) Disconnect electrical connector from defogging fan (Ref. Fig. 401) and install protective caps on electrical connector.

(5) Remove screws and washers attaching transition duct to defogging fan.

(6) Remove screws and washers attaching defogging fan to support assembly.

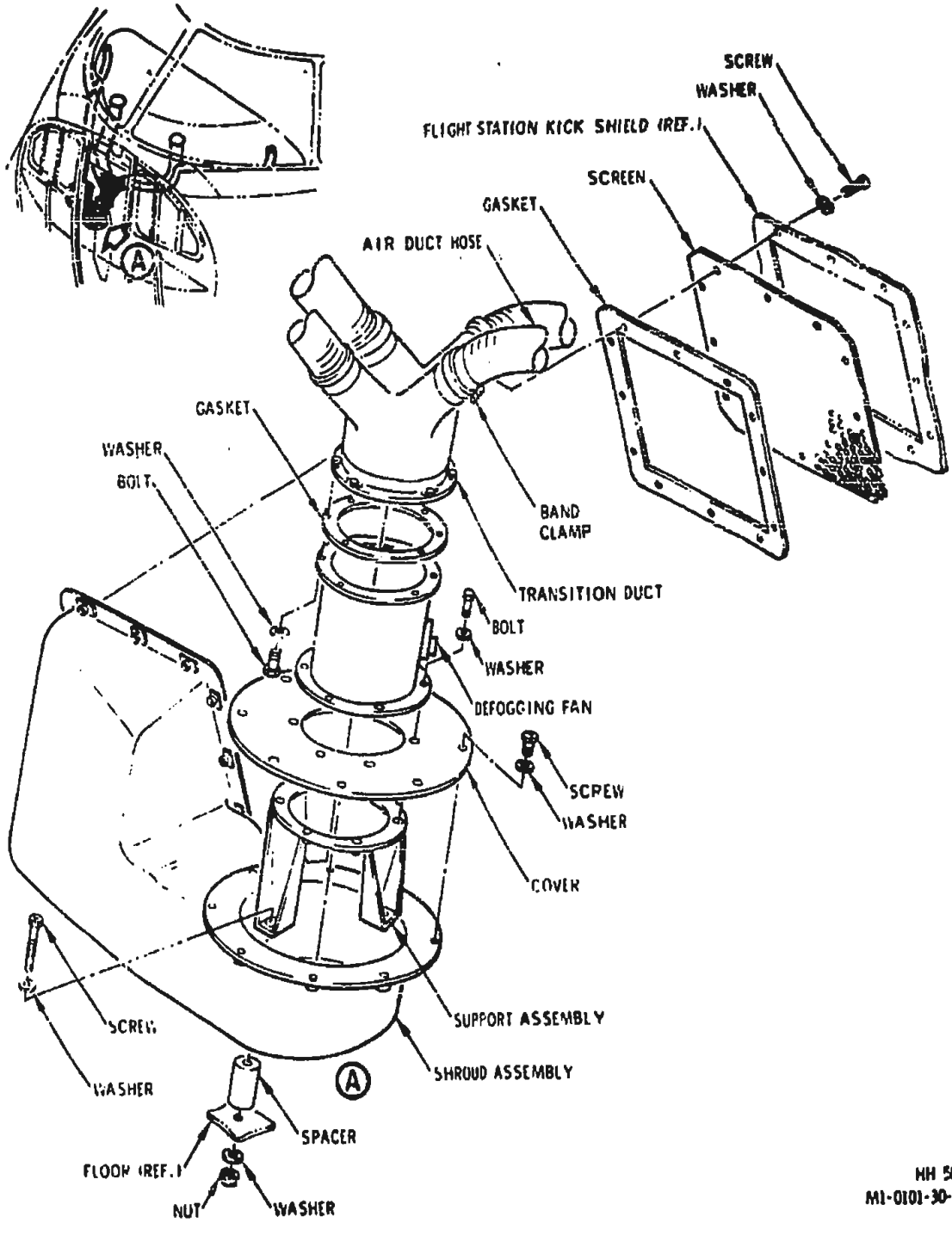
(7) Lift defogging fan out of aircraft.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Install defogging fan on support assembly and secure with mounting screws and washers.

(3) Bolt transition duct and gasket to defogging fan.



R Windshield Defogging Fan - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

R (4) Remove protective caps and connect electrical connector
R to defogging fan.

R (5) Replace access panels (Ref. 53-11-51).

R (6) Close and secure radome.

R (7) Remove tags and close circuit breakers opened in Step
R 3A(1).

R (8) Test defogging fan (Ref. 30-41-00).

WINDSHIELD RAIN REPELLENT SYSTEM - DESCRIPTION AND OPERATION

1. General

The windshield rain repellent system is an electrically controlled fluid system that sprays a repellent fluid on the windshields to improve vision as necessary. The system has four
R nozzles, mounted at the base of the windshield area, zone 210, which are connected to a pressurized manifold and tube system. The manifold receives the repellent fluid from an aerosol-type throw-away container which charges the system when screwed into the manifold. Nitrogen gas is used to pressurize the container, and Freon is used as a solvent carrier. The Captain and First Officer control the operation of their respective windshields. The major components in the system are:

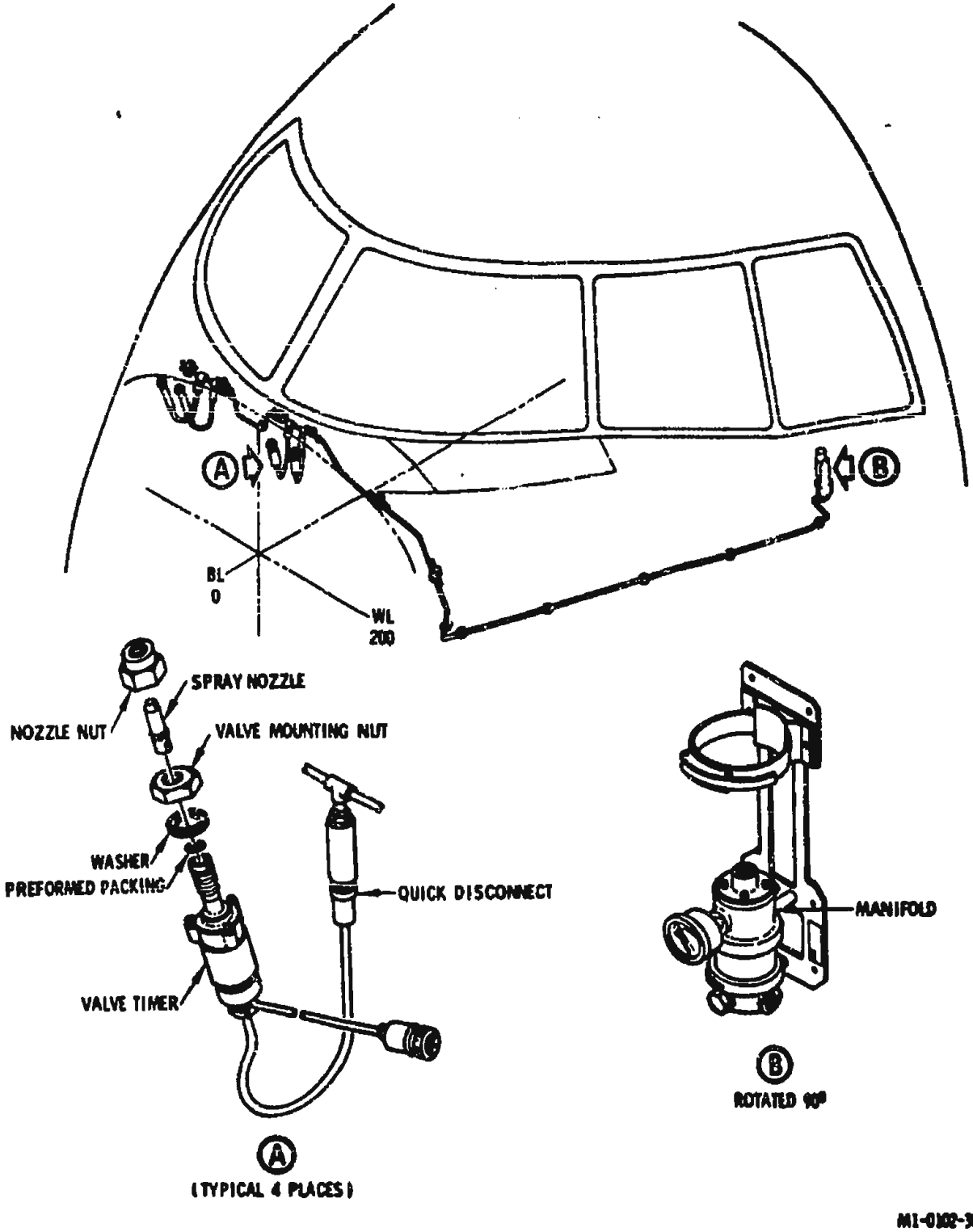
Four valve/timer/nozzles, two each for the Captains and First Officers windshields, located at the outside base of the windshield with the nozzles protruding through the skin, zone 110 (Ref. Fig. 1).

R A manifold, located in the rear left console area, zone 211.

Two REPELLENT, push-button switches, one each located on the
R Captains and First Officers WIPER control panels, zone 210.

Each valve/timer/nozzle has a solenoid-controlled poppet valve and a solid state timer circuit which operate on 28V dc. The timer circuit limits valve operation to (approximately) 1.0 second, during which time 16 to 22 cc of repellent fluid are released. The manifold is used to store and distribute fluid to the nozzles. The manifold has a window-type indicator which displays a REFILL float when repellent fluid is low. A pressure gage on the side of the manifold records the pressure of the fluid in the system. The gage scale is divided into green and red areas to indicate a go, no-go condition. If the pressure gage indication is in the red area, or if the REFILL float is fully visible, the repellent container is in a discharged condition, and therefore must be replaced. The repellent container is secured above the manifold by a band clamp. When the container is unscrewed from the manifold, a manifold check valve prevents residual repellent or system pressure from being released.

Power for the windshield rain repellent system is provided by the 28V dc standby bus through two circuit breakers designated
R RAIN REPELLENT INBD (L1) and RAIN REPELLENT OUTBD (L2) located on the pilots overhead circuit breaker panel, CB1.



M1-0102-30-008

R
R

Rain Repellent System
Figure 1

EFFECTIVITY: ALL

001B

2. Operation

CAUTION: THE WINDSHIELD RAIN REPELLENT SYSTEM DOES NOT FUNCTION AS A WINDSHIELD WASHER AND MUST NOT BE OPERATED IN DRY AIR OR LIGHT RAIN.

R When the Captains REPELLENT pushbutton switch is depressed, 28V dc from the rain repellent circuit breaker is applied to the No. 1 left valve/timer/nozzle (Ref. Fig. 2).

R At the same time, 28V dc power from the OUTBD rain repellent circuit breaker is applied to the No. 2 left valve/timer/nozzle. In both the No. 1 and No. 2 left units, the 28V dc triggers the solid state timer circuit which opens the solenoid poppet valve for a fixed period of (approximately) 1.0 second. With both valves in the open position, pressurized repellent fluid from the manifold is forced through tubes to the No. 1 and No. 2 nozzle outlets. The nozzles direct the repellent to an area at the left windshield base. As fluid strikes the windshield, the Freon evaporates and leaves a concentrated repellent agent which forms a gel on the windshield. When the gel comes in contact with rain, the gel disperses over the windshield to form a transparent water-repellent film. During driving rain conditions the film lasts for several minutes.

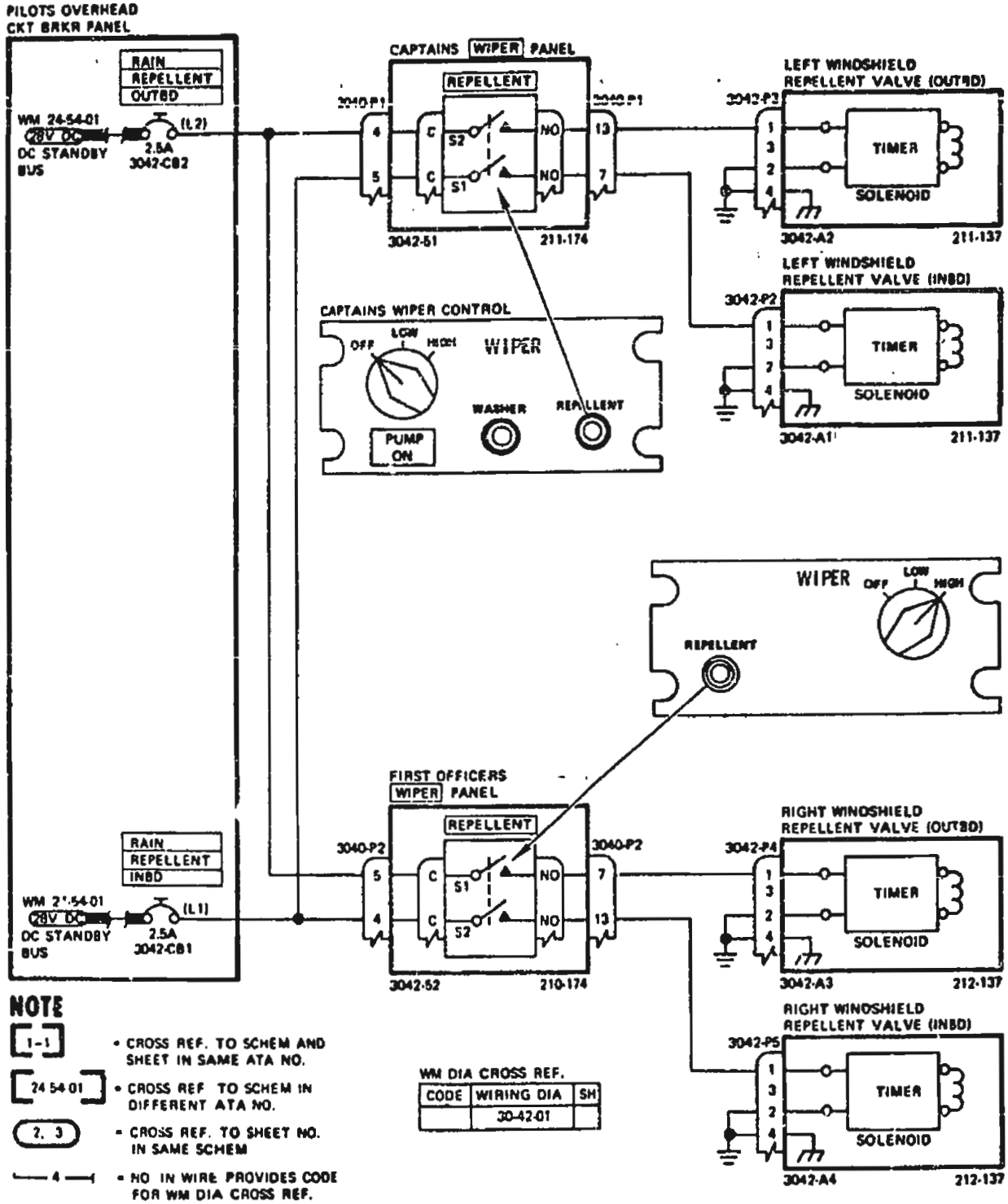
R When the First Officers REPELLENT pushbutton switch is depressed, 28V dc from the RAIN REPELLENT circuit breaker is applied to the No. 1 right valve/timer/nozzle. At the same
R time, 28V dc from the RAIN REPELLENT circuit breaker is applied to the No. 2 right valve/timer/nozzle. The circuit operation for the No. 1 and No. 2 left unit is identical.

3. Manifold Assembly

A. Description and Operation

The manifold assembly stores rain repellent fluid and distributes it to valve/timer/nozzles. The inlet port of the manifold assembly interfaces with a disposable aerosol-type container (Ref. Fig. 3).

The assembly consists of an upper and lower housing separated by a fluid-level indicator window. The two housings are held together by a bolt which also guides a fluid-level float. The float, designated REFILL, is not visible in the window when the manifold is full. Repellent fluid from a pressurized container enters the manifold through an inlet port in the upper housing. The inlet port incorporates a check valve assembly. Fluid is routed to the tube system through an outlet port in the lower housing. A drain port, located in the lower housing, is used to remove



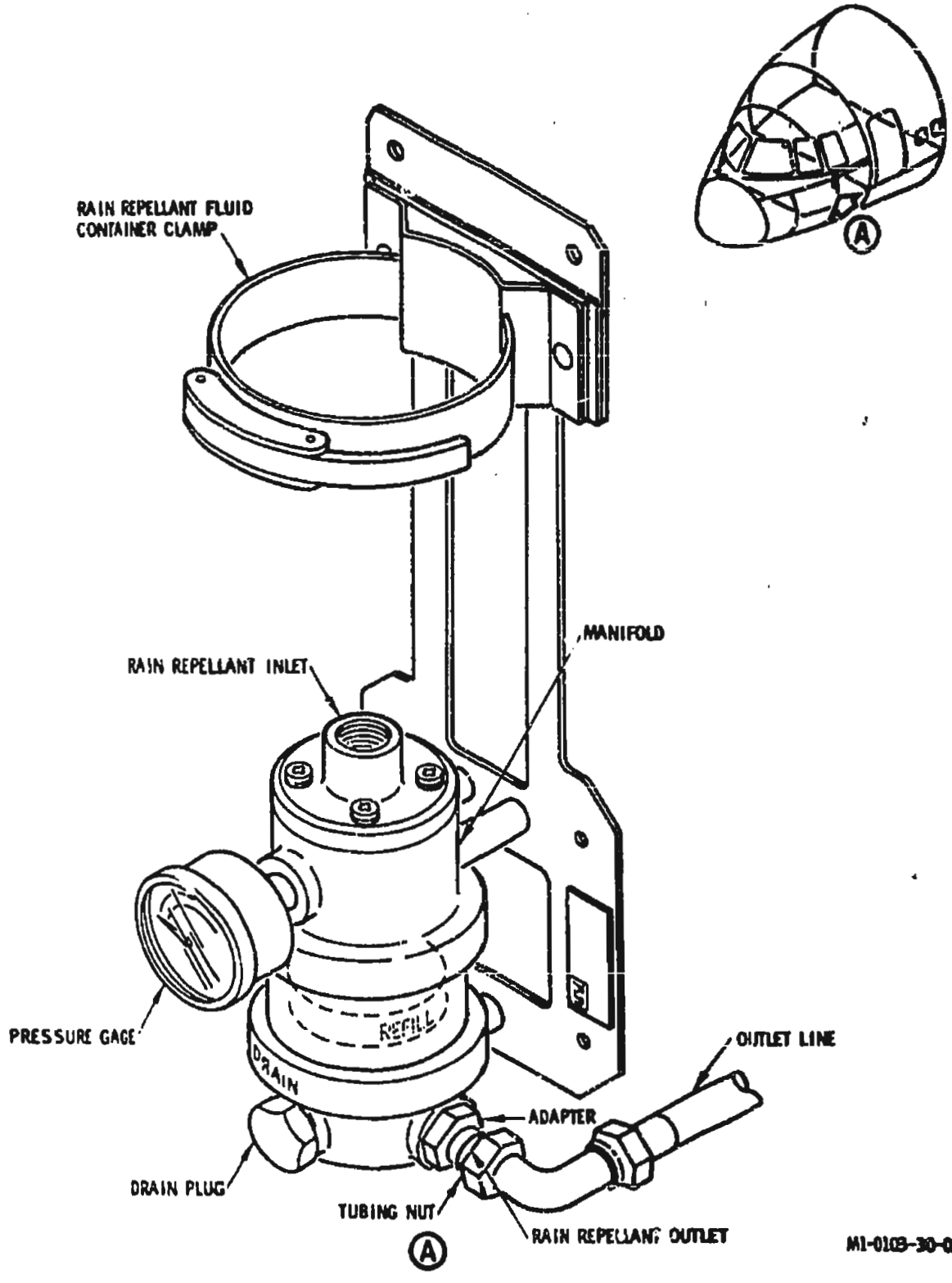
NOTE

1. [1-1] • CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2. [24 54 01] • CROSS REF TO SCHEM IN DIFFERENT ATA NO.
3. (2, 3) • CROSS REF. TO SHEET NO. IN SAME SCHEM
4. —4— • NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5. RELAY SUPPRESSION DIODES OMITTED FOR CLARITY
6. ALL REF. DESIGNATIONS ARE PREFIXED WITH 3042 UNLESS OTHERWISE NOTED.

WM DIA CROSS REF.

CODE	WIRING DIA	SH
	30-42-01	

R Windshield Rain Repellent Control Schematic EM1-0003-30-015
R Figure 2



R
R

Rain Repellent Manifold
Figure 3

system fluid during maintenance. A clamp and backplate, located above the manifold, provides a retaining fixture for the repellent container after it is screwed into place.

A pressure gage attached to the upper housing has a divided red and green scale to record system pressure. The red scale indicates 0 to 45 psig and the green scale indicates 45 to 200 psig. When indicated pressure is in the green band range it is adequate for normal system operation.

When a pressurized container is screwed into the manifold inlet port, the manifold check valve is opened to allow repellent fluid to enter the manifold. The REFILL indicator rises with the fluid level and disappears from view when full. The pressure gage indicator records the pressure in the manifold and the container. When the container is unscrewed from the manifold, the spring-loaded check valve closes, thereby preventing escape of repellent or pressure
R from the inlet port. A check valve in the pressurized
R container outlet port performs the same function.

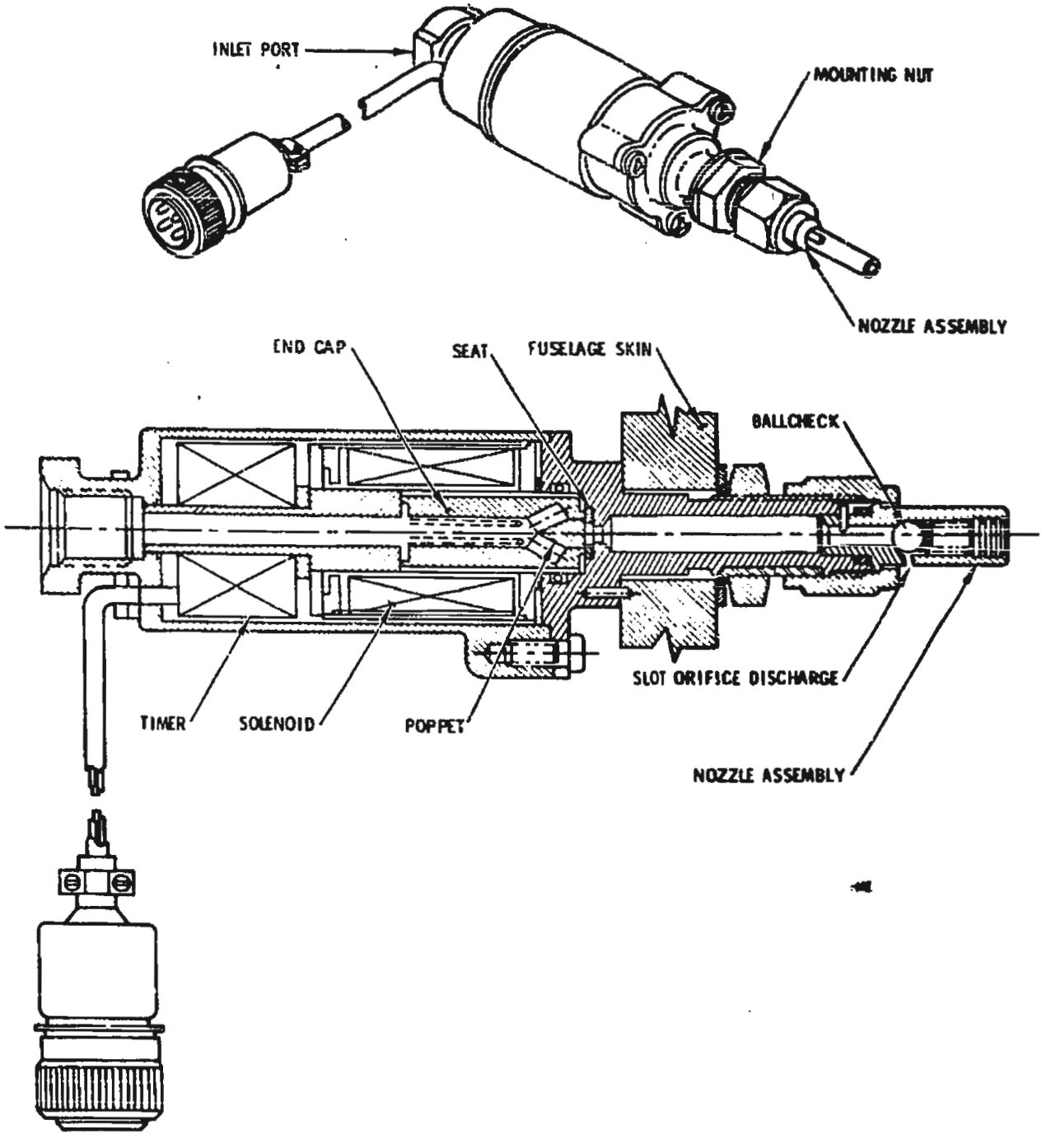
4. Valve/Timer/Nozzle

A. Description and Operation

Four valve/timer/nozzle assemblies are used to control the release of rain repellent fluid. Each assembly consists of a cylindrical-type housing with a fluid inlet connection at one end and a spray nozzle outlet at the other. Inside the assembly is a solenoid valve and a solid-state timer. The solenoid valve consists of a core center bored for a fluid passage, a spring, a poppet valve, and an electrical coil. The poppet valve is spring-loaded to the closed position. The solid-state circuit is miniaturized and uses transistors to control the solenoid time operation. Electrical connection is made through a connector and pigtail lead located at the valve inlet end.

A flange fitting attaches the spray nozzle to the main assembly. The upper part of the spray nozzle assembly can be unscrewed, from outside the aircraft, for cleaning without removing the complete assembly from the aircraft (Ref. Fig. 4).

When 28V dc from the REPELLENT pushbutton switches, located on the WIPER control panels in the pilots overhead panel, zone 210, is applied to the valve/timer/nozzle, the solenoid energizes and the timing circuit is triggered. The solenoid opens the poppet valve and allows the repellent fluid to flow from the inlet port through the valve center. The fluid is forced through the poppet holes over the valve seat



M1-0101-30-004

R Rain Repellent Valve/Timer/Nozzle
R Figure 4

EFFECTIVITY: ALL

0018

into the spray nozzle opening. The fluid is sprayed from the nozzle through atmosphere to the windshield for a short period after which the timing circuit removes power from the solenoid coil, which causes the spring-loaded poppet to close and stop fluid flow.

R

R RAIN REPELLENT SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for troubleshooting WINDSHIELD RAIN REPELLENT system faults are included in this manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is block 1.

R PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the WINDSHIELD RAIN REPELLENT system. It gives the area and access of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 is a list of all fault isolation data in this section of the manual.

TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Insufficient Rain Repellent on Windshield
SCHEM 1	Windshield rain repellent control schematic

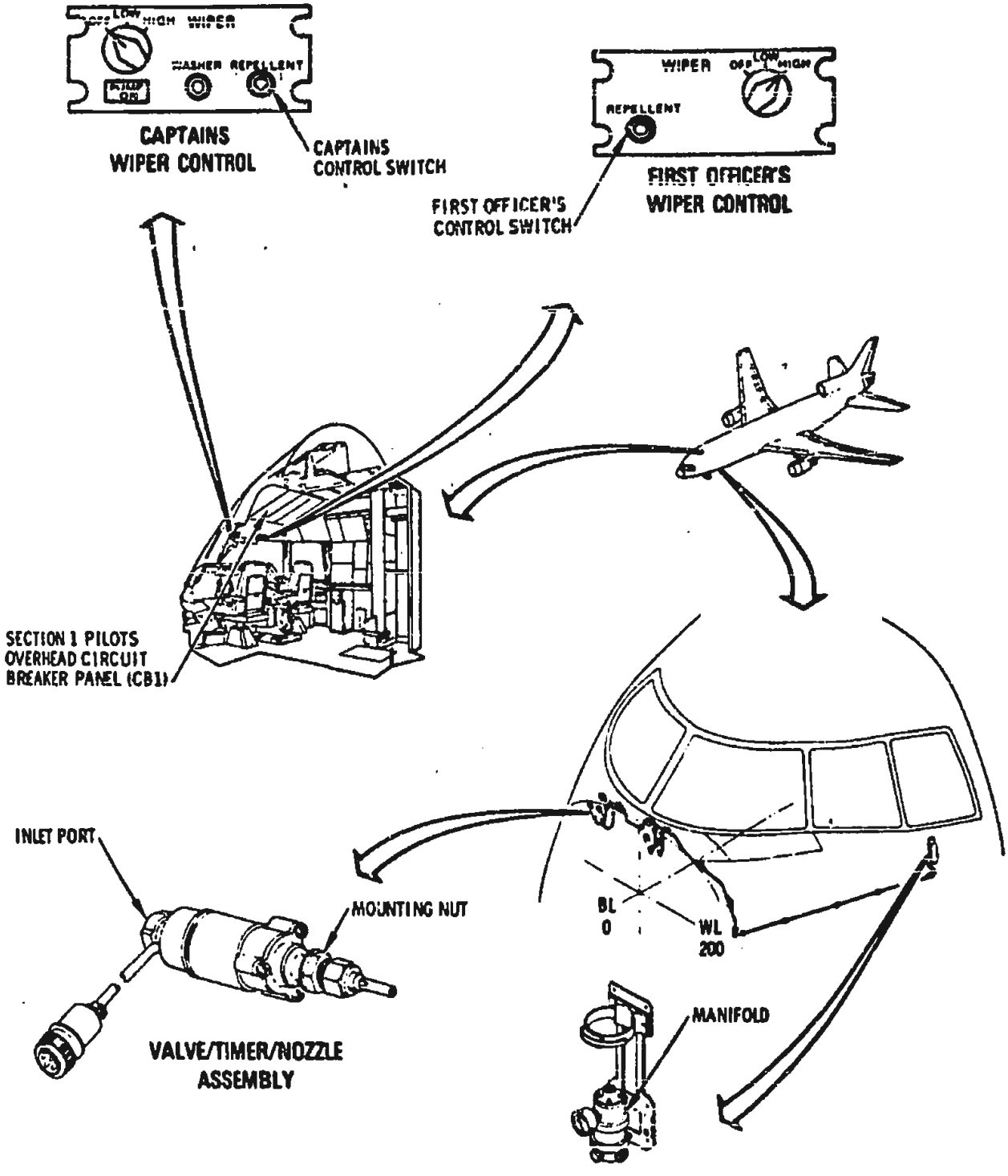
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
RAIN REPELLENT, OUTBOARD (3042-CB1)	1	PILOTS OVHD CRT BRKR PANEL (CB1); P6	*
RAIN REPELLENT, INBOARD (3042-CB2)	1	PILOTS OVHD CRT BRKR PANEL (CB1); P6	*
MANIFOLD	1	FLT STA, LOWER LEFT SIDE	30-42-01
SWITCH - CONTROL, CAPTAINS (3042-S1)	1	CAPT WIPER CONTROL PANEL; P5	30-42-06
SWITCH - CONTROL, FIRST OFFICERS (3042-S2)	1	F/O WIPER CONTROL PANEL; P5	30-42-06
VALVE/TIMER/NOZZLE, CONTROL, LEFT INBOARD (3042-A1)	1	PRESS BLKHD PNLS; 111BZ/CZ	30-42-02
VALVE/TIMER/NOZZLE, CONTROL, LEFT OUTBOARD (3042-A2)	1	PRESS BLKHD PNLS; 111BZ/CZ	30-42-02
VALVE/TIMER/NOZZLE, CONTROL, RIGHT INBOARD (3042-A4)	1	PRESS BLKHD PNLS; 111BZ/CZ	30-42-02
VALVE/TIMER/NOZZLE, CONTROL, RIGHT OUTBOARD (3042-A3)	1	PRESS BLKHD PNLS; 111BZ/CZ	30-42-02

*SEE WM EQUIPMENT LIST

M1-0000-30-6068

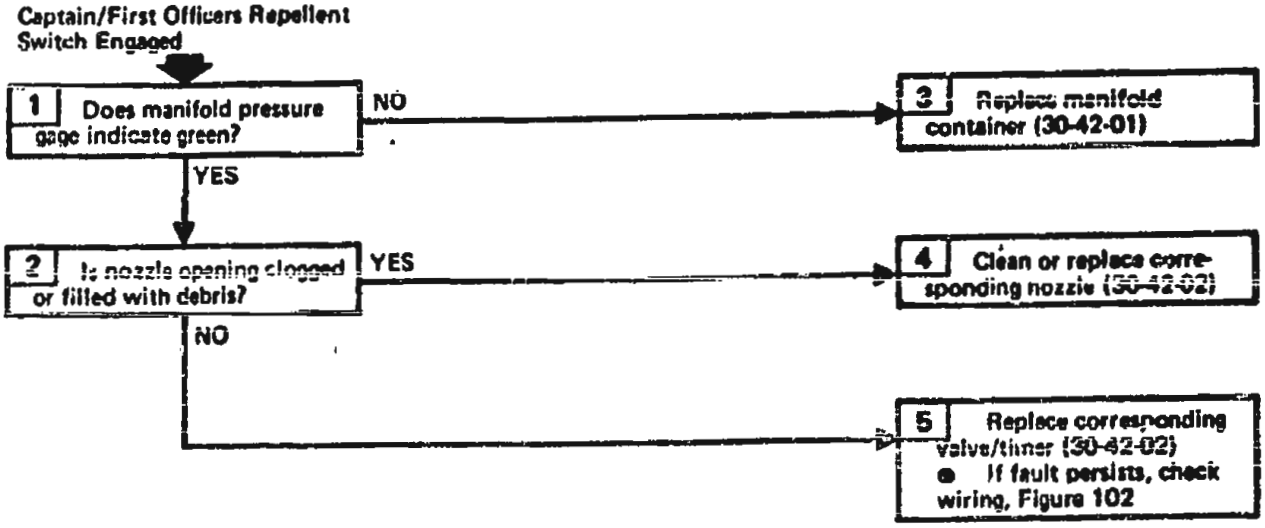
R
R Component Locator Index
Figure 101

R EFFECTIVITY: ALL
R
001B



R
R Component Locator Diagram
Figure 102

R EFFECTIVITY: ALL
R
0018


Captain/First Officers Repellent Switch Engaged
1 Does manifold pressure gage indicate green?
NO
3 Replace manifold container (30-42-01)
YES
2 Is nozzle opening clogged or filled with debris?
YES
4 Clean or replace corresponding nozzle (30-42-02)
NO
5 Replace corresponding valve/timer (30-42-02)
• If fault persists, check wiring, Figure 102

WARNING

WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

WARNING

DO NOT ALLOW SKIN OR EYES TO COME IN CONTACT WITH RAIN REPELLENT FLUID. IMMEDIATELY FLUSH AFFECTED AREA WITH WATER.

CAUTION

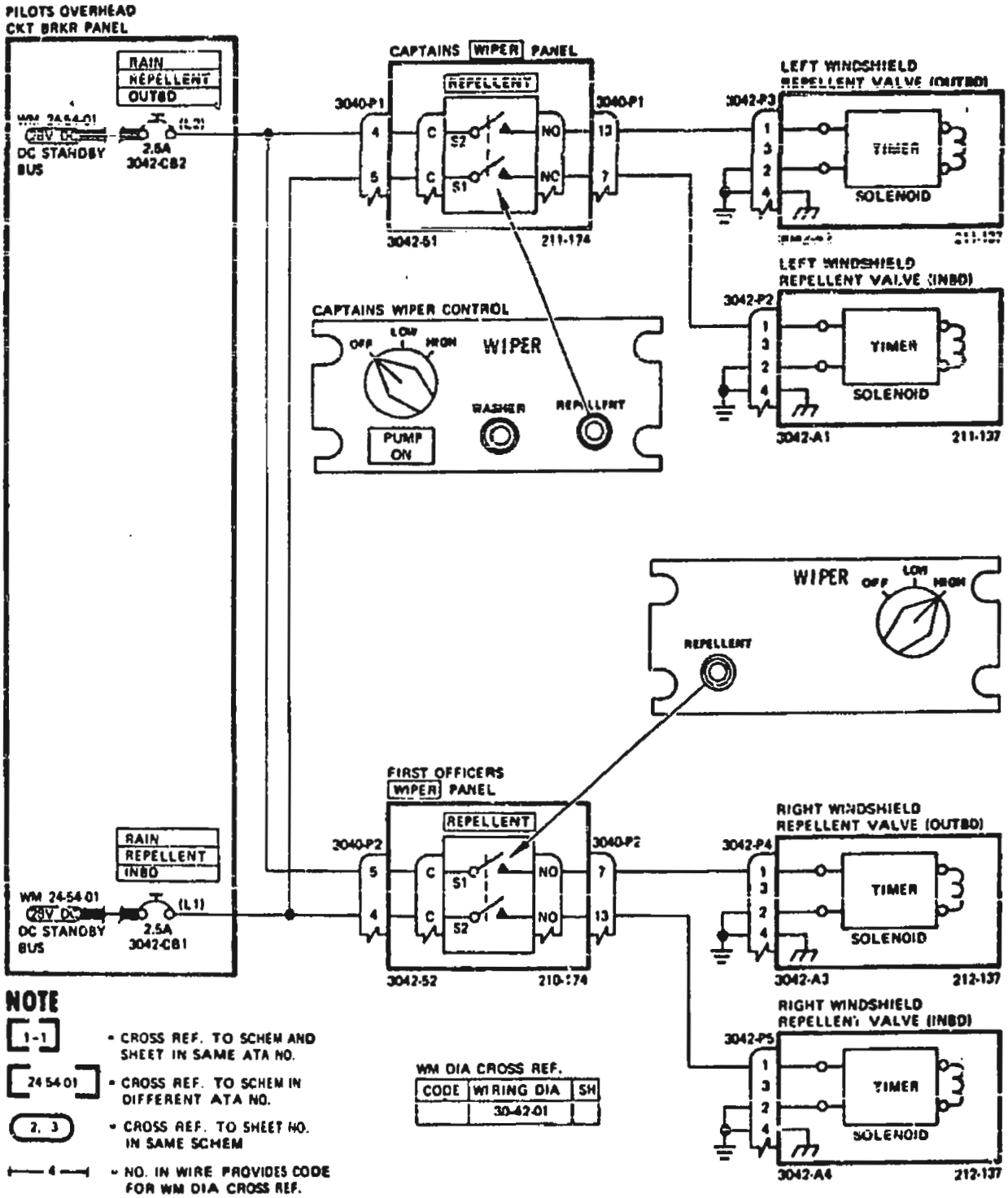
DO NOT OPERATE RAIN REPELLENT SYSTEM ON A DRY WINDSHIELD. DO NOT ALLOW RAIN REPELLENT TO DRY ON AIRCRAFT SKIN.

PREREQUISITES
Elec Pwr (24-00-00)
CB's in: L1 and L2

M1-0100-30-5024

R Insufficient Rain Repellent on Windshield
R Figure 103

R EFFECTIVITY: ALL
R
001B



NOTE

1. [1-1] • CROSS REF. TO SCHEM AND SHEET IN SAME ATA NO.
2. [24 54 01] • CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
3. (2, 3) • CROSS REF. TO SHEET NO. IN SAME SCHEM
4. —4— • NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5. RELAY SUPPRESSION DIODES OMITTED FOR CLARITY
6. ALL REF. DESIGNATIONS ARE PREFIXED WITH 3042 UNLESS OTHERWISE NOTED

WM DIA CROSS REF.

CODE	WIRING DIA	SH
	30-42-01	

R Windshield Rain Repellent Control Schematic
R SCHEM 1

EM1-0003-30-015

EFFECTIVITY: ALL

WINDSHIELD RAIN REPELLENT SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
30-42-01	Windshield Rain Repellent - Inspection and Check
56-10-01	Windshields - Cleaning and Painting

2. Adjustment/Test

A. Operational Test

WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

CAUTION: DO NOT OPERATE RAIN REPELLENT SYSTEM ON A DRY WINDSHIELD. DO NOT ALLOW RAIN REPELLENT TO DRY ON AIRCRAFT SKIN.

WARNING: DO NOT ALLOW SKIN OR EYES TO COME IN CONTACT WITH RAIN REPELLENT FLUID. IMMEDIATELY FLUSH AFFECTED AREA WITH WATER.

(1) Check that adequate supply of rain repellent is available (Ref. 30-42-01).

(2) Wet windshields with water and maintain in a thoroughly wet condition for the duration of this test.

(3) Turn on electrical power (Ref. 24-41-00).

R (4) On pilots overhead circuit breaker panel CB1, zone 210,
R check that circuit breakers RAIN-REPELLENT - INBD (L1) and OUTBD (L2) are closed.

(5) On Captains WIPER panel, zone 210, momentarily depress the REPELLENT switch. Check that fluid is expelled from both rain repellent nozzles, that fluid strikes the lower area of the windshield, and that the spray duration is automatically controlled.

(6) Repeat Step 2A(5) for First Officers WIPER control panel.

(7) Turn off electrical power (Ref. 24-41-00).

(8) Wash windshields and surrounding area thoroughly (Ref. 56-10-01).

WINDSHIELD RAIN REPELLENT MANIFOLD - REMOVAL AND INSTALLATION

1. Referenced Procedure

30-42-00	Windshield Rain Repellent System - Adjustment and Test
56-10-01	Windshields - Cleaning and Painting

2. Removal/Installation

A. Removal

(1) Remove repellent container from manifold located in rear of left console area, zone 211 (Ref. Fig. 401).

(a) Release overcenter clamp.

(b) Unscrew container from manifold.

(2) Spray water on windshield and repeatedly actuate the rain repellent system until all pressure is removed from the lines.

(3) Wash windshields and surrounding area thoroughly (Ref. 56-10-01).

(4) On pilots overhead circuit breaker panel CB1, open and tag RAIN REPELLENT INBD (L1) and OUTBD (L2) circuit breakers.

(5) Place a container under the manifold rain repellent outlet and disconnect the outlet line (Ref. Fig. 402).

(6) Remove nuts, bolts, and washers securing manifold mounting assembly.

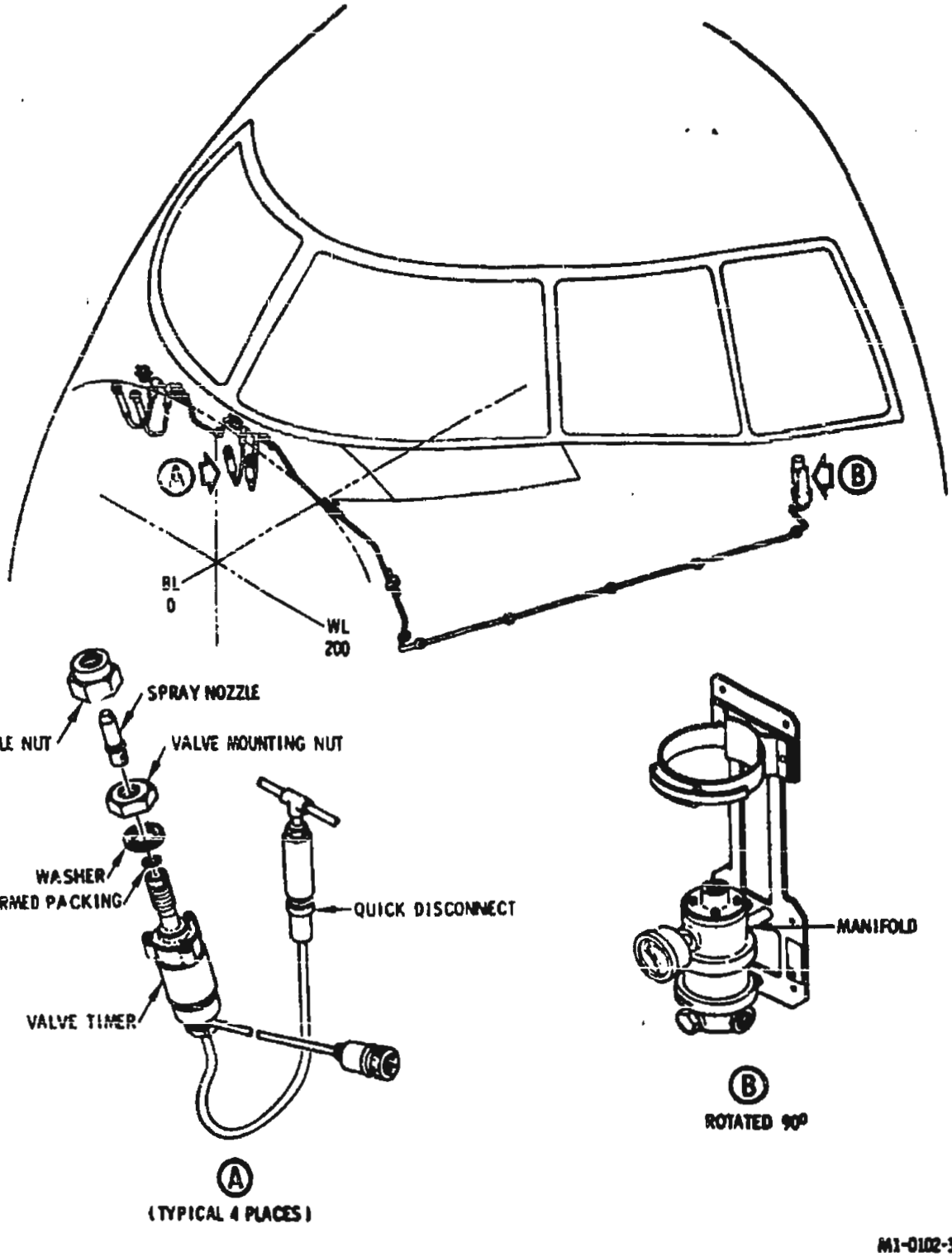
B. Installation

(1) Verify circuit breakers listed for removal are open.

(2) Install manifold mounting assembly with nuts, bolts, and washers.

(3) Connect outlet line to manifold adapter. Using backup wrench, torque tubing nut to 120-168 pound-inch (Ref. Fig. 402).

(4) Install rain repellent container in manifold.

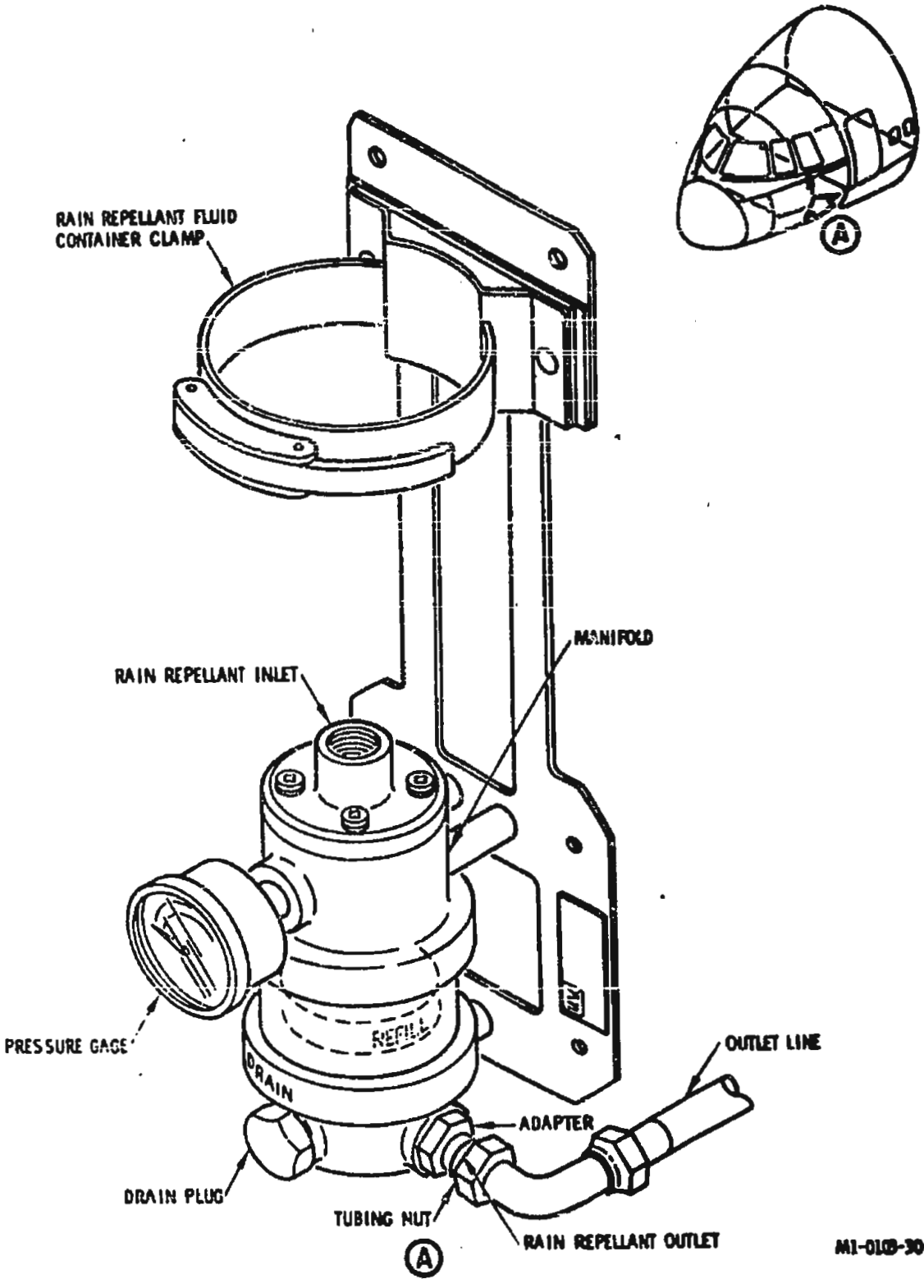


R
R

Rain Repellent System
Figure 401

EFFECTIVITY: ALL

001B



R
R

Rain Repellent Manifold
Figure 402

EFFECTIVITY: ALL

001B

R (a) Screw container into manifold, and finger tight
R only.

(b) Latch overcenter clamp.

(5) Remove tags and close circuit breakers opened in Step 1A(3).

(6) Spray water on windshield and actuate the rain repellent system to check operation.

(7) Verify operation of rain repellent system (Ref. 30-42-00).

R (8) Wash windshield and surrounding area thoroughly (Ref.
R 56-10-01).

WINDSHIELD RAIN REPELLENT MANIFOLD - INSPECTION AND CHECK

R 1. Referenced Procedure

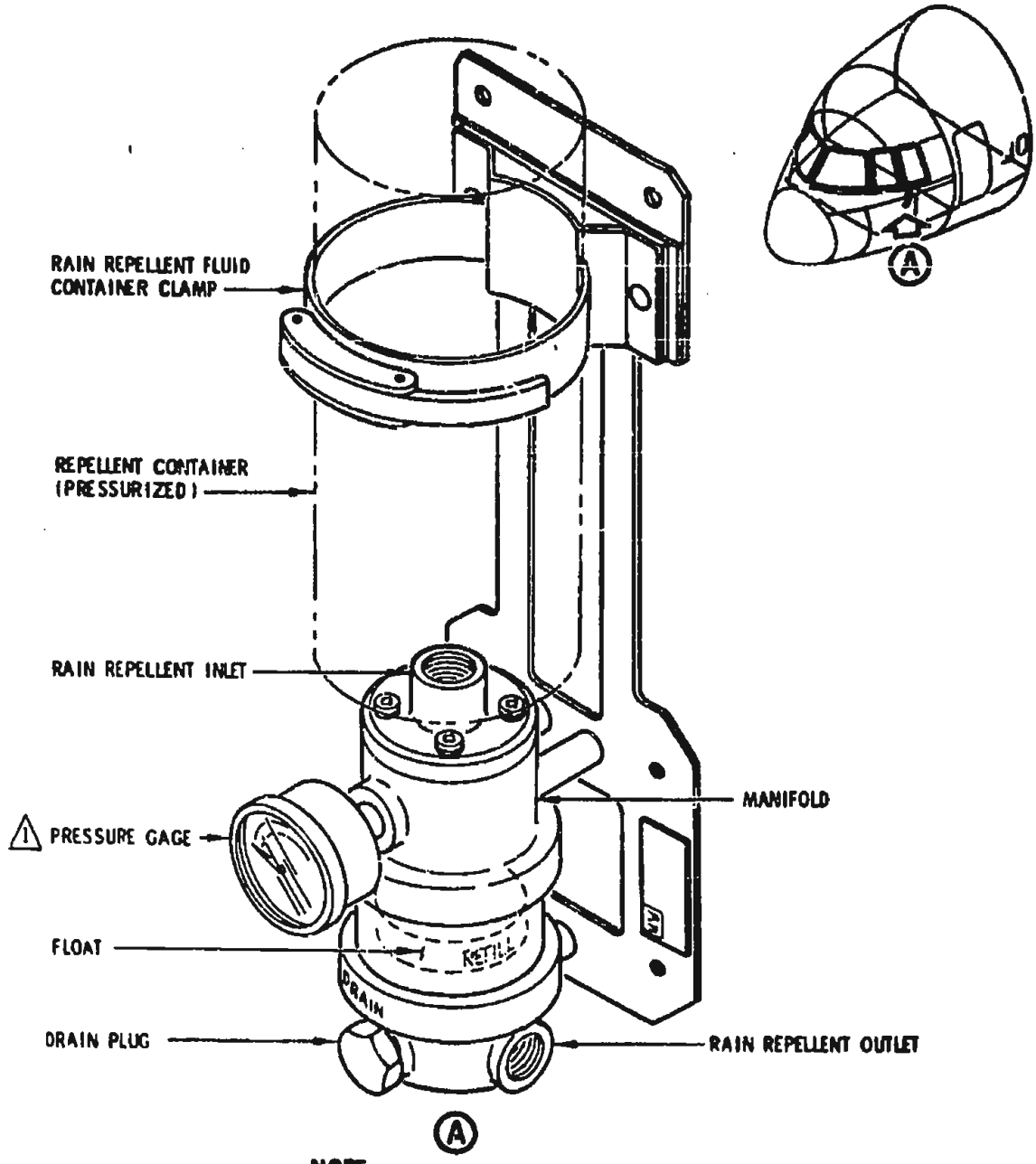
R 12-16-02 Windshield Rain Repellent - Servicing

R 2. Inspection/Check

A. Check

(1) Visually examine the manifold pressure gage and window indicator (Ref. Fig. 601).

(2) If the pressure gage indication is in the red area, or if the REFILL float is fully visible, replace the
R repellent container (Ref. 12-16-02).



NOTE

1

OPERATING PRESSURE	
MINIMUM	45 PSIG
MAXIMUM	250 PSIG
OPERATING	70-90 PSIG

M1-0102-30-142

R
R

Rain Repellent Manifold
Figure 601

VALVE/TIMER/NOZZLE - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for all rain repellent control valve/timer/nozzle assemblies,
R located at the base of the windshield, zone 210. Referenced access panels and circuit breakers are different for the Captains and the First Officers sides of the windshield.

R The RAIN REPELLENT, INBD (L1) and OUTBD (L2) circuit breakers are on the pilots overhead circuit breaker panel CB1, zones 211 and 212. Access to the Captains control valve/timer/nozzles is through the left access panel on the pressurized bulkhead behind the radome, zone 111. Access to the First Officers control valve/timer/nozzles is through the right access panel on the pressurized bulkhead behind the radome, zone 111.

2. Referenced Procedures

R 20-51-04 Environmental Sealing of Model L-1011 Airplane -
R PB75-425

30-42-00 Windshield Rain Repellent System - Adjustment and Test

3. Equipment and Materials

R Preformed Packing,

4. Removal/Installation

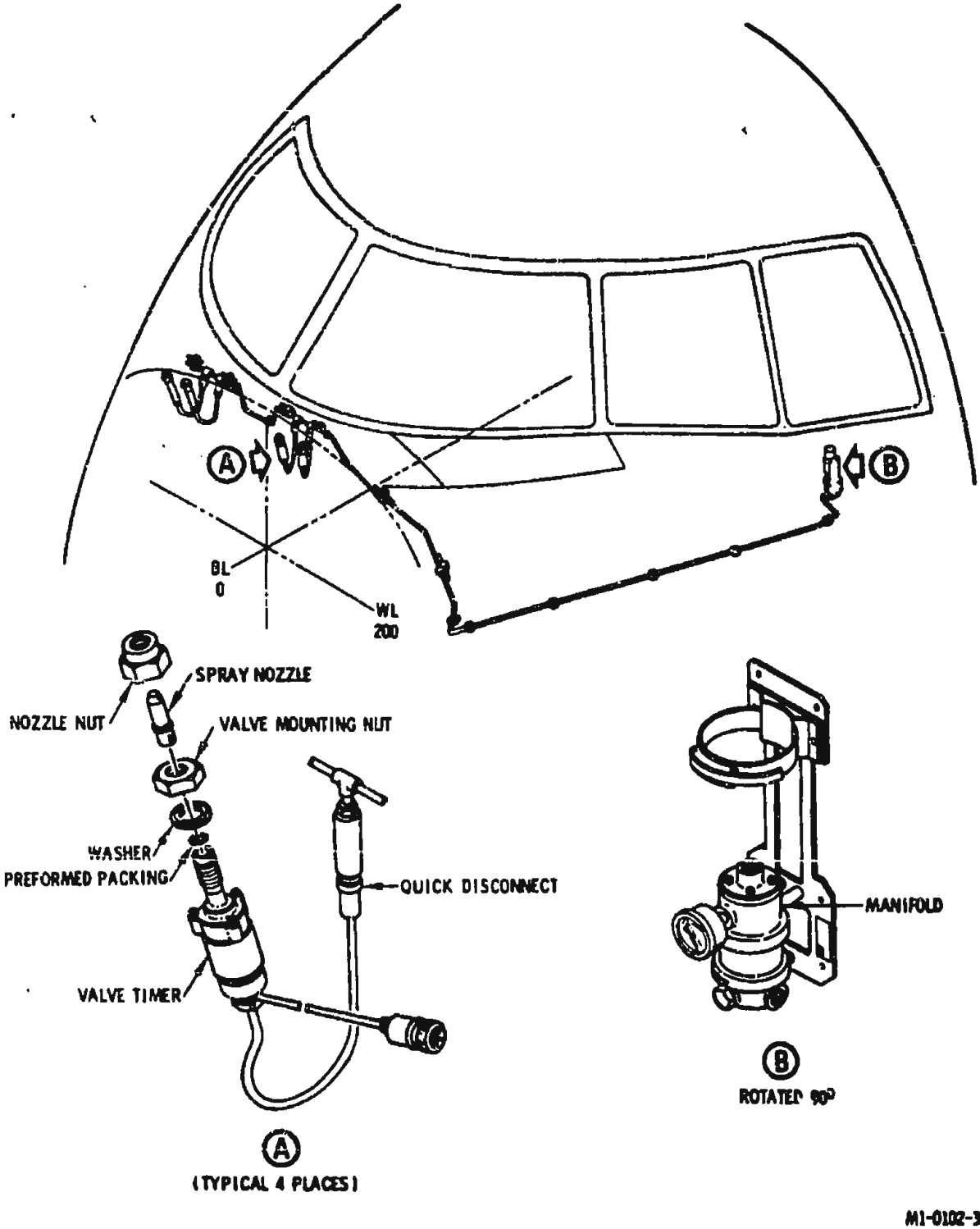
WARNING: DO NOT ALLOW RAIN REPELLENT TO COME IN CONTACT WITH SKIN OR EYES. IMMEDIATELY FLUSH AFFECTED AREA WITH WATER.

A. Removal - Spray Nozzle

R (1) Open and tag RAIN REPELLENT, INBD (L1) and OUTBD (L2)
R circuit breaker.

(2) At base of windshield, remove nut holding spray nozzle assembly out of valve end cap and discard preformed packing (Ref. Fig. 401).

B. Installation - Spray Nozzle



M1-0102-30-028

R Windshield Rain Repellent System
R Figure 401

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) At base of windshield observe indexing and insert nozzle assembly with new preformed packing into valve end cap and install nut.

(3) Tighten nut. With backup wrench on valve mounting nut, R torque nozzle nut to 70-90 pound-inches.

(4) Remove tag and close circuit breaker opened in Step 4A(1).

(5) Verify operation of rain repellent system (Ref. 30-42-00).

C. Removal - Control Valve/Timer/Nozzle Assembly

(1) Open and tag RAIN REPELLENT, INBD (L1) and OUTBD (L2) circuit breaker.

(2) Remove repellent container from manifold in rear of left console, zone 211.

(a) Release overcenter clamp.

(b) Unscrew container from manifold.

(3) Remove spray nozzle as in Step 4A(2).

(4) Open radome, zone 111.

(5) Remove bolts securing applicable access panel to pressurized bulkhead.

(6) Disconnect assembly hose from tubing by the quick disconnect.

(7) Disconnect the electrical connector from the assembly.

(8) Remove the mounting nut and washer securing the assembly at the base of the windshield and pull the assembly down out of the mounting hole. Remove existing environmental seal residue at inner and outer surfaces of structure.

D. Installation - Control Valve/Timer/Nozzle Assembly

(1) Verify that circuit breaker opened Step 4C(1) is open and tagged.

(2) Environmental seal assembly mounting hole (Ref. 20-51-04).

(3) Align valve index pin with hole in structure and insert assembly in mounting hole and attach with washer and
R mounting nut. With backup wrench on wrench flat at
R lower (inlet) end of valve housing, torque nut to
R 105-125 pound-inches.

(4) Install spray nozzle as in Step 4B.

(5) Connect assembly hose to tubing by the quick disconnect.

(6) Connect electrical connector to assembly.

(7) Remove tag and close circuit breaker opened in Step 4C(1).

CAUTION: DO NOT OPERATE RAIN REPELLENT SYSTEM ON A DRY WINDSHIELD. DO NOT ALLOW RAIN REPELLENT TO DRY ON WINDSHIELD.

(8) Verify operation of rain repellent system (Ref. 30-42-00).

(9) Bolt access panel to pressurized bulkhead with original or identical-length bolts.

(10) Close and secure radome.

VALVE/TIMER/NOZZLE - CLEANING

1. General

The following cleaning procedure is applicable for all rain repellent spray nozzles located at the base of the windshield, zone 111. Cleaning can be done without removing the nozzle. Paragraph 4A is applicable when the nozzle is removed from the aircraft and Paragraph 4B is applicable when the cleaning is to be done on the aircraft.

2. Referenced Procedures

30-42-00 Rain Repellent System - Adjustment and Test

30-42-02 Valve/Timer/Nozzle - Removal and Installation

3. Equipment and Materials

Tool, Valve Clearing - G/ITEL 30-42-01

R Shop Air (10 psig)

Preformed Packing, Task Corp PN M83248/1-902

Petrolatum, Fed Spec VV-P-236 (commercially available)

R Protective Goggles

4. Cleaning

A. Spray Nozzle Head Cleaning

(1) Remove spray nozzle (Ref. 30-42-02).

R WARNING: DO NOT USE COMPRESSED AIR IN EXCESS OF 10 psig.
R WEAR PROTECTIVE GOGGLES WHILE USING COMPRESSED
R AIR. FAILURE TO COMPLY MAY RESULT IN EYE INJURY.

(2) Clean out spray nozzle opening with a 0.026 inch-maximum diameter wire. Blow out all debris. Check that ball check is spring-loaded against seat.

NOTE: Nozzle is fan shaped slot, 100° x 0.030 ±0.010.

(3) Install spray nozzle (Ref. 30-42-02).

R WARNING: DO NOT ALLOW RAIN REPELLENT TO COME IN CONTACT
R WITH SKIN OR EYES. IMMEDIATELY FLUSH AFFECTED
R AREA WITH WATER.

(4) Test rain repellent system (Ref. 30-42-00).

B. Valve/Nozzle Cleaning on Aircraft

(1) Remove nozzle assembly (Ref. 30-42-02) and discard packing

(2) Check nozzle assembly for evidence of repellent residue accumulation. If any build-up of repellent residue is in evidence, discard nozzle assembly and obtain a new nozzle assembly.

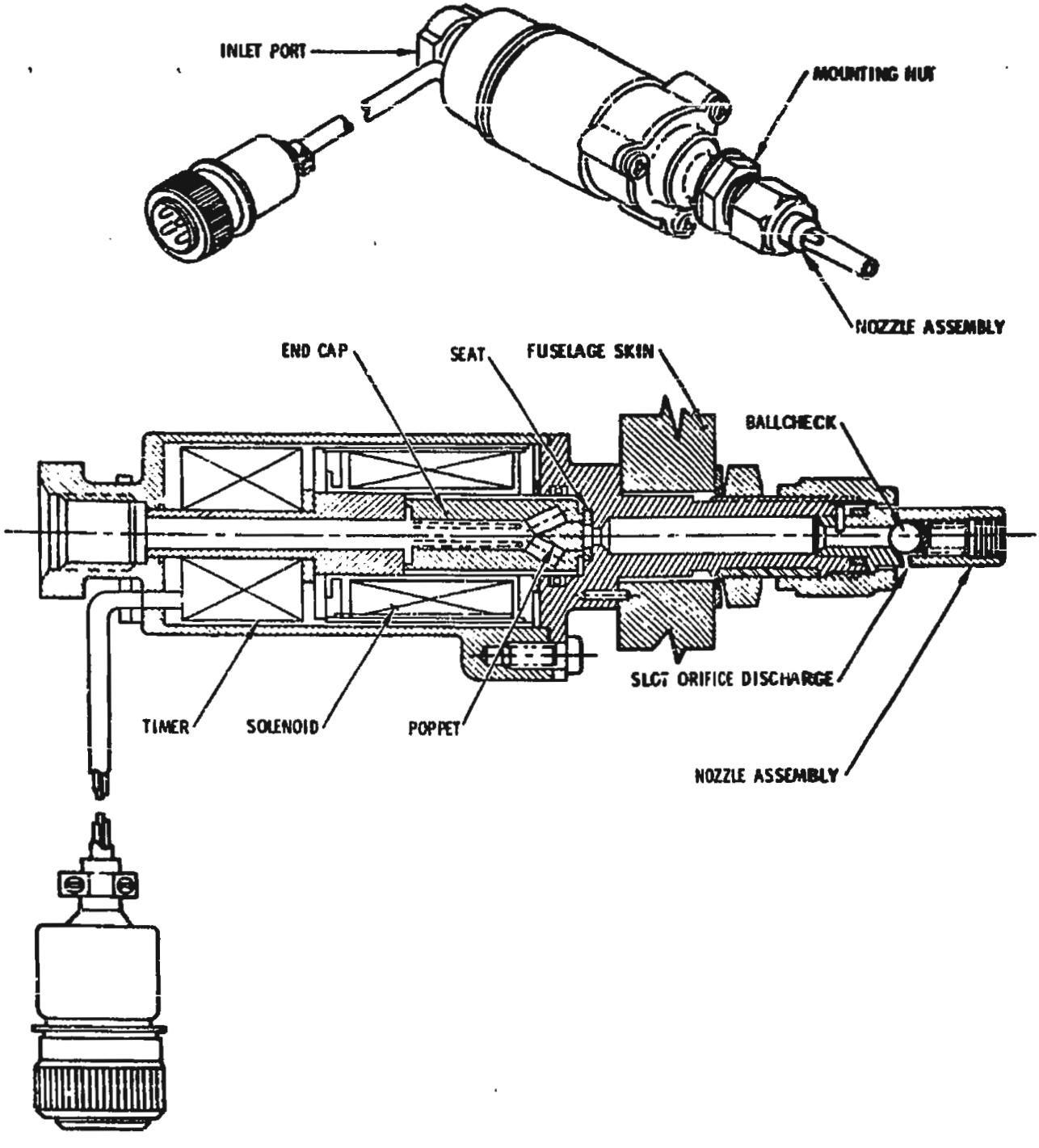
(3) Locating slot in end of valve clearing tool (Ref. G/ITEL 30-42-01) with pin in port of end cap, insert tool into port. Momentarily press on the tool to unseat poppet and allow sufficient fluid to squirt out to clean any residue build-up from the end cap orifice at the poppet end (Ref. Fig. 701).

NOTE: A plastic bag should be placed over the tool and the valve/nozzle to catch ejected repellent.

(4) Dislodge and clean away any visual repellent residue from ports of the valve/nozzle.

(5) Apply a thin film of petrolatum to a new packing, then install packing on nozzle assembly.

(6) Aligning slot in nozzle assembly with pin in end cap, install the nozzle assembly (Ref. 30-42-02). Secure nozzle assembly to end cap with nut.



M1-0101-30-004

R Rain Repellent Valve/Timer/Nozzle
R Figure 701

WINDSHIELD WASHER SYSTEM - DESCRIPTION AND OPERATION

1. General

The windshield washer system is used to clean the left and right windshields. The major components of the washer system are:

R Windshield washer reservoir/pump located on the right side of the forward electronic service center, zone 112, (Ref. Fig. 1)

Power control relay located in the forward electronic service center

Alternate action WASHER pushbutton switch located on the Captains WIPER panel, zone 210

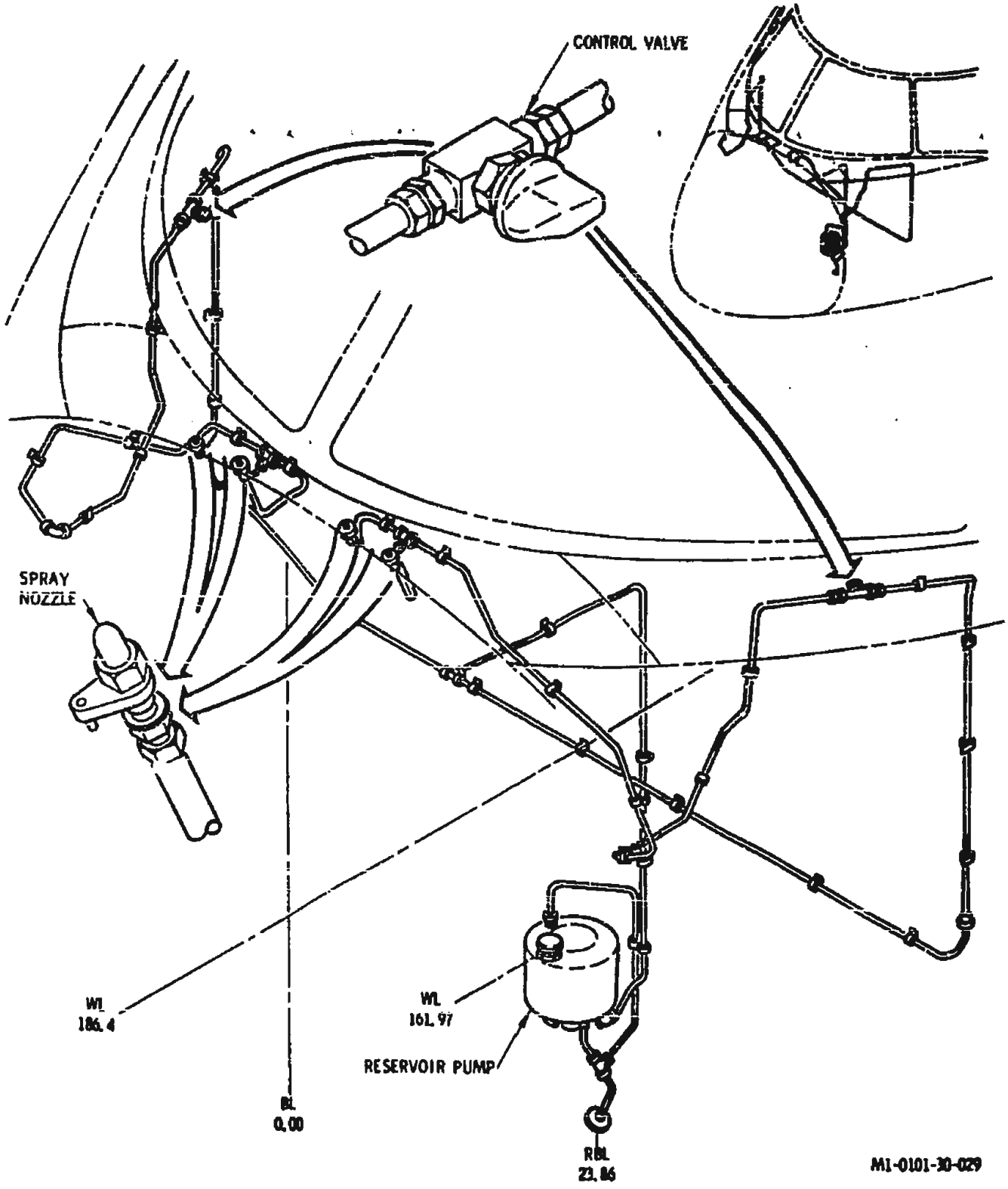
A PUMP ON indicator light located on the Captains WIPER panel

Two manual control valves: one located on the left side console, and the other located on the right side console, zone 210

R Four spray nozzles located at the base of the windshield area: two for the left windshield and two for the right windshield, zone 210.

Washing fluid is routed from the reservoir/pump to the four nozzles through stainless steel tubing. A single outlet from the reservoir/pump is divided by a T-fitting. One side of the T-fitting feeds fluid through a control valve to the left windshield nozzles, and the other side of the T-fitting feeds fluid through a control valve to the right windshield nozzles. The control valves provide selective flow control to each windshield. The check valve, located in the outlet port of the reservoir/pump, prevents fluid in the tube system from flowing back into the reservoir and keeps the system primed and ready
R for use. Each nozzle head has two spray hole outlets, one
R nozzle head directs the washer fluid spray toward the inboard
R windshield lower edge, while the other nozzle head directs the
R washer fluid toward the outboard windshield lower edge. The
R washer fluid impact points are in line with each nozzle spray
R approximately ten inches above the windshield lower edge. The
R washer fluid impact point for each nozzle spray forms a vertical
R oval pattern approximately two by four inches on impact (Ref.
R Figure 1 Sheet 2).

A bayonet-type cap located on top of the windshield washer reservoir/pump provides the access for refilling the system.

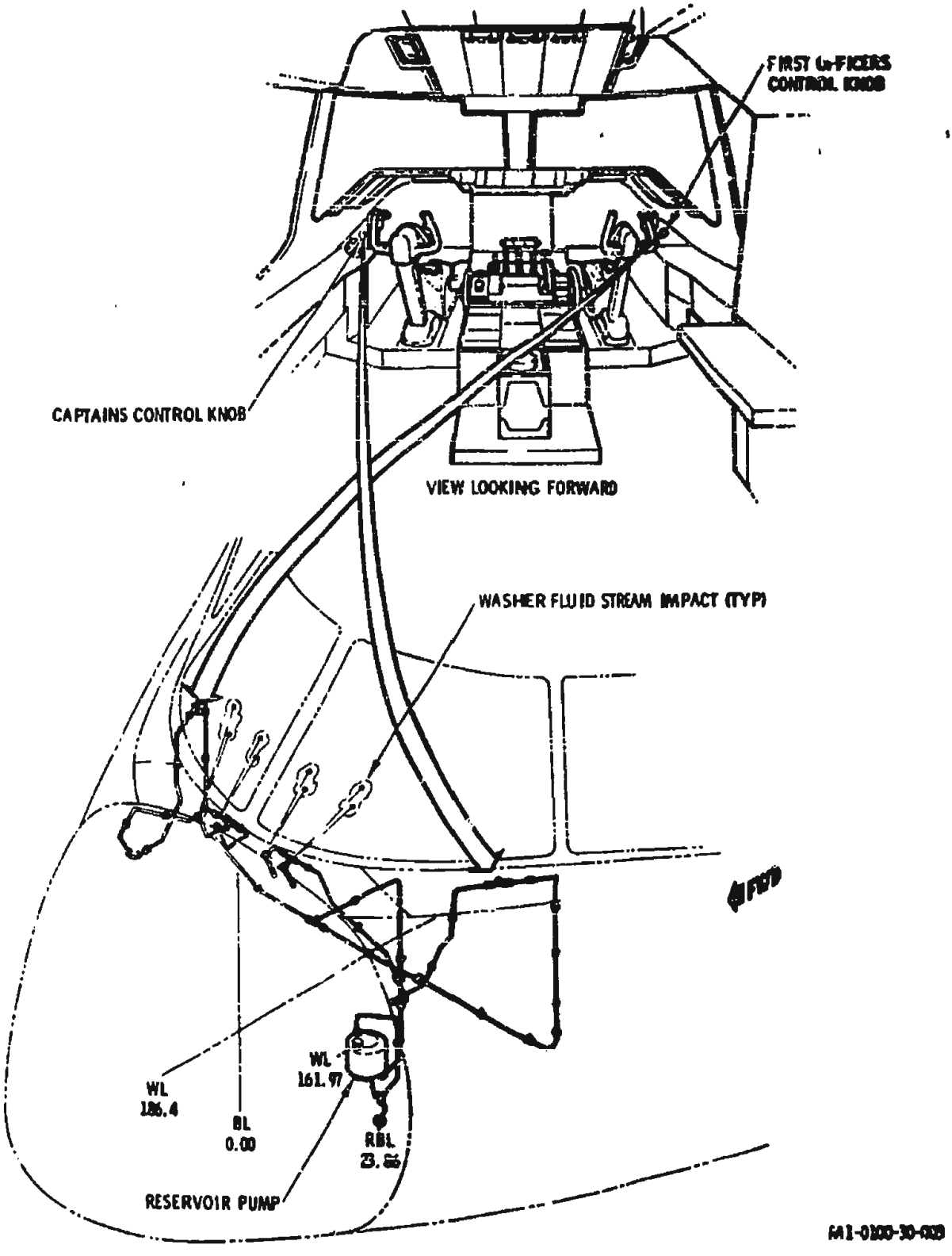


R
R

Windshield Washer System
Figure 1 (Sheet 1)

EFFECTIVITY: ALL

001B



R
R

Windshield Washer System
Figure 1 (Sheet 2)

The reservoir holds approximately 1 gallon of fluid. There is a sight gage at the reservoir mid-point to check fluid level. A manually operated drain valve, spring-loaded to the closed position, is located at the lower part of the reservoir/pump. When the valve is pushed and held in, the reservoir fluid drains overboard through a tube attached to the reservoir/pump. Fluid in the tubing remains in the system.

The electrical pump operation is controlled by the WASHER pushbutton switch. When the WASHER control switch is pushed in, it remains in the ON position until pushed again. The PUMP ON indicator shows that the system is energized. Power to operate the electrical pump is supplied by the 115V ac, 400 Hz, bus 3 extension through the WINDSHIELD WASHER PUMP circuit breaker. Control power for the relay coil is provided by the 28V dc bus 3 through the WINDSHIELD WASHER CONT circuit breaker. The circuit breakers are located on the Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215.

2. Operation

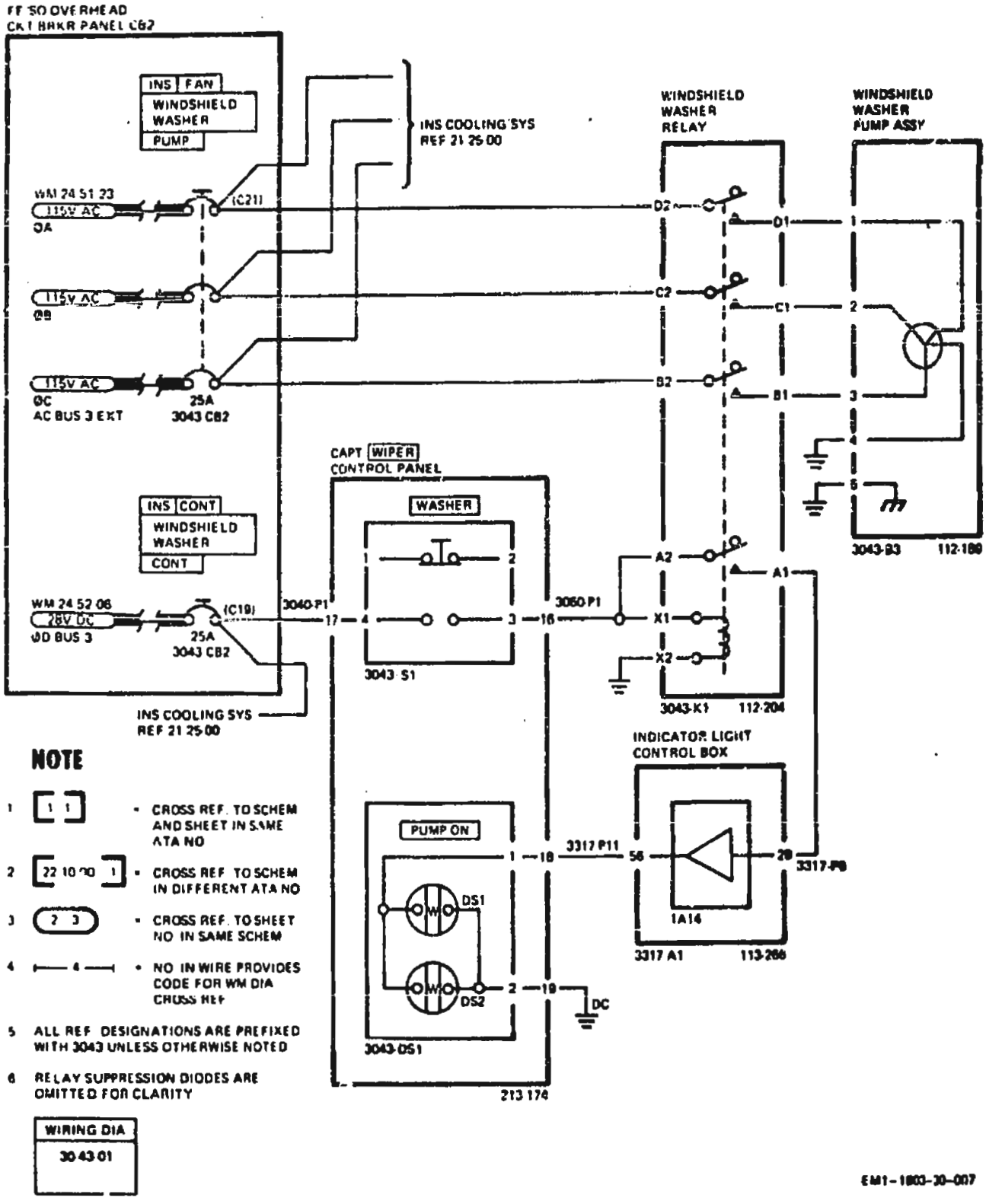
Depressing the WASHER pushbutton switch applies 28V dc from the WINDSHIELD WASHER CONT circuit breaker to the windshield washer power relay coil (Ref. Fig. 2). The relay energizes and its auxiliary contact routes 28V dc from the CONT circuit breaker to the indicator lights control box (Ref. 33-17-00) to turn on the PUMP ON indicator light. At the same time, the three main contacts on the power relay close and connect three-phase power from the WINDSHIELD WASHER PUMP circuit breaker to the reservoir/pump.

The reservoir/pump is energized and forces fluid from the reservoir into the tubing system. The fluid is forced through each arm of the T-fitting through the two manual (open) control valves to the windshield nozzles. The fluid is sprayed continuously from the nozzle outlets onto the windshield. The pump motor continues to run even when the fluid is expended. Pushing the WASHER switch to the off position removes the 28V dc from the power relay coil, which removes power from the system. The PUMP ON indicator goes off, and the pump motor stops running.

3. Reservoir/Pump Assembly

A. Description and Operation

The windshield washer reservoir/pump assembly holds and pressurizes washer fluid for use in the windshield washer system (Ref. Fig. 3).



R Windshield Washer System Schematic
R Figure 2

EFFECTIVITY: ALL

The assembly consists of:

Main housing (reservoir)

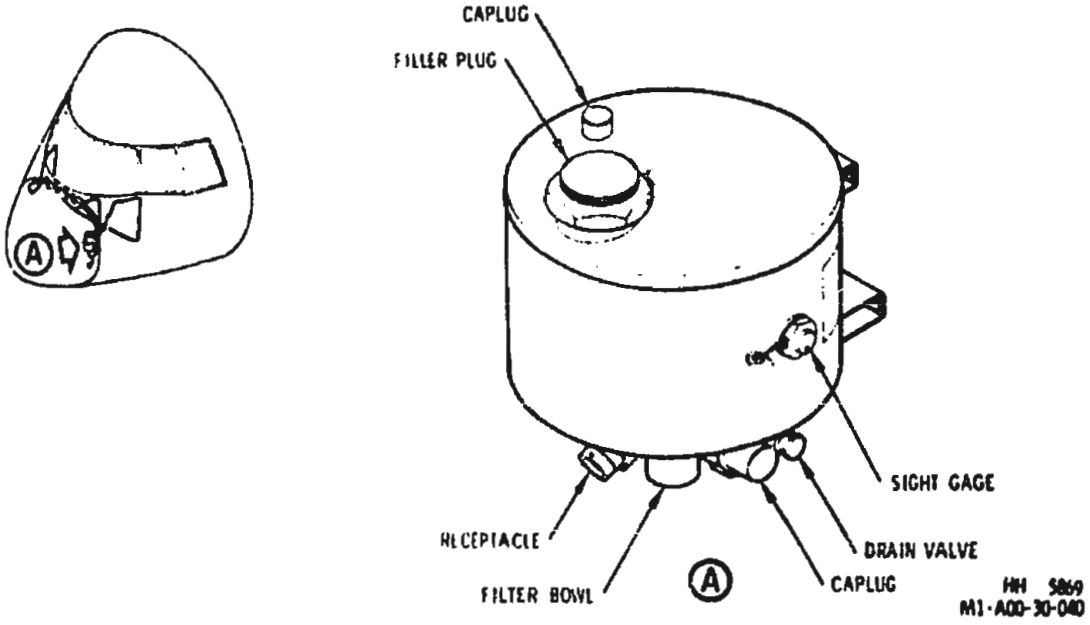
AC motor

Centrifugal pump

Filter bowl

Electrical connection is made through a single connector located in the pump housing. The motor and pump housings are screwed together into the reservoir so that the pump impeller sits submerged in fluid at the lowest point. The motor is a Y-connected, induction-type, operating on 115V ac, 400-Hz, three-phase power. A thermal protection fuse in each phase line prevents the motor case temperature from
R exceeding 300 (+25) degrees F [149 (+14)°C].

Fluid is added to the system through a bayonet-type cap at the top of the reservoir. A mesh-type filter in the opening prevents foreign material from entering the system. An overboard vent port at the top of the reservoir/pump prevents overpressurization of the reservoir. When in operation, fluid is forced through an outlet port located in the pump housing at the lower port of the assembly. A



Windshield Washer Reservoir/Pump
Figure 3

spring-loaded check valve in the outlet port prevents fluid in the tubing system from returning into the reservoir/pump.

A manually operated PUSH TO OPEN drain valve, mounted in the pump housing, is spring-loaded to the closed position. The outlet from this valve is attached to a tube which is routed overboard. When pushed, the valve opens a port to allow fluid to drain through the overboard outlet. All reservoir fluid, except that retained in the filter bowl, can be drained through this valve at the rate of 0.5 gallon per minute.

When three-phase power is applied to the reservoir pump, the electrical motor is energized and the centrifugal pump rotates. The pump forces fluid from the reservoir through the filter to the check valve. The check valve moves off its seat, which releases pressurized fluid through the outlet port into the tube system. The maximum fluid flow rate is 10 gallons per hour at a pressure of 35 (±5) psig.

R # WINDSHIELD WASHER SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for troubleshooting windshield washer system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is block 1.

R PREREQUISITES listed at the top of each diagram identify manditory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the windshield washer system. It gives the area and access of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 is a list of all fault isolation data in this section of the manual.

TABLE 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Insufficient Washer Fluid on Windshield
SCHEM 1	Windshield Washer System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
WINDSHIELD WASHER CONTROL 3043-CB1	1	FE/SO OVHD CKT BRKR PNL CB2/P10	•
WINDSHIELD WASHER PUMP 3043-CB2	1	FE/SO OVHD CKT BRKR PNL CB2/P10	•
CONTROL BOX, INDICATOR LIGHTS (ILCB) CARD 1A14 3317-A1	1	FESC/112AB	33-17-04
INDICATOR LIGHT: PUMP ON 3043-DS1	1	CAPT WIPER CONTROL PNL/P5	30-43-05
RELAY, WASHER 3043-K1	1	FESC, BOTTOM OF FWD RH RACK/112AB	30-43-01
RESERVOIR/PUMP 3043-B3	1	FESC, FWD OF RT EQUIP RACK/112AB	30-43-01
SPRAY NOZZLES	4	BASE OF WINDSHIELD	30-43-07
SWITCH, CONTROL 3042-S1	1	CAPT WIPER CONT PNL/P5	30-43-05
VALVE, CONTROL, LEFT	1	FLT STA	30-43-02
VALVE, CONTROL, RIGHT	1	FLT STA	30-43-03

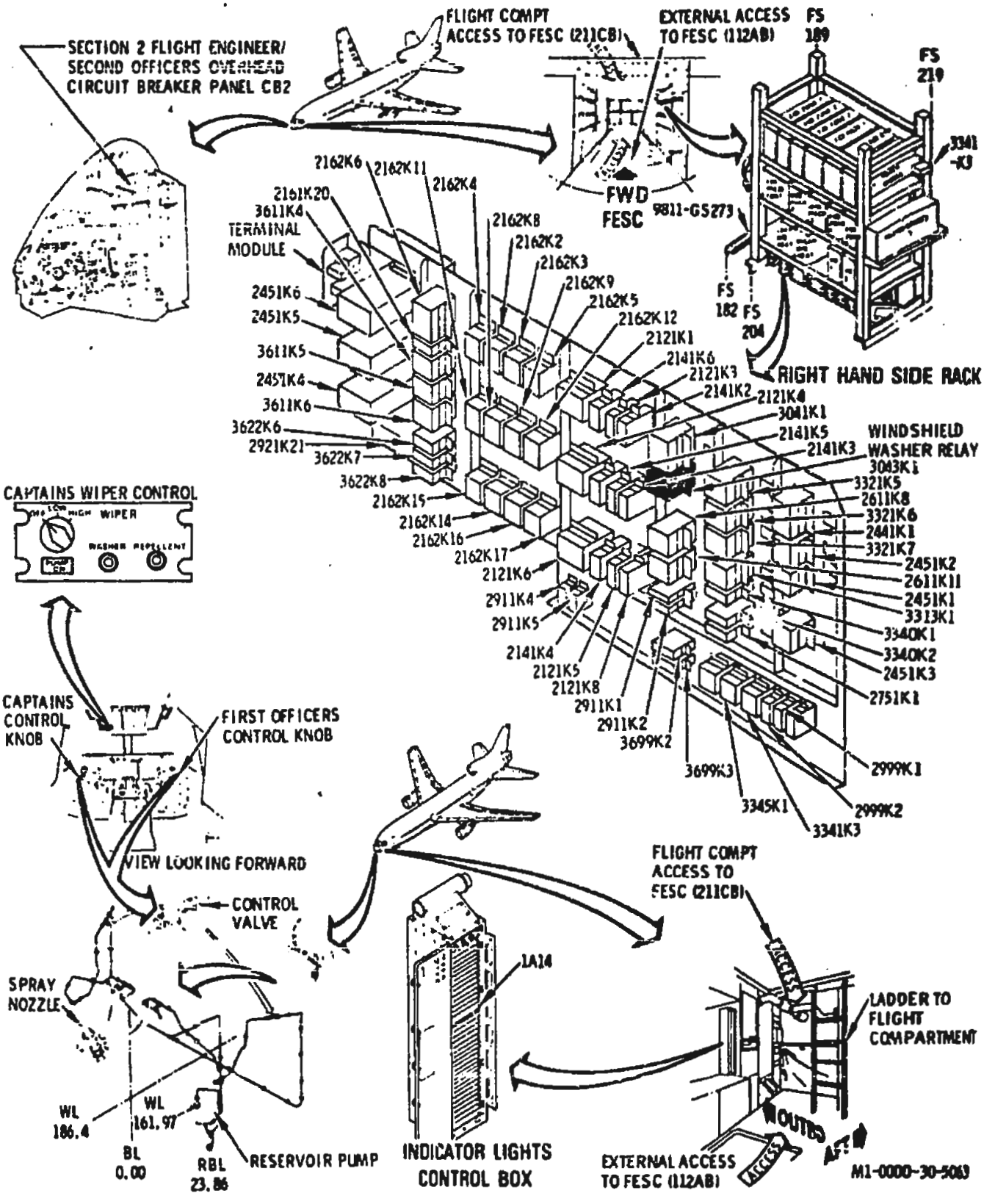
*SEE WM EQUIPMENT LIST

M1-0000-30-5062

R R Component Location Index
Figure 101

R R EFFECTIVITY: ALL

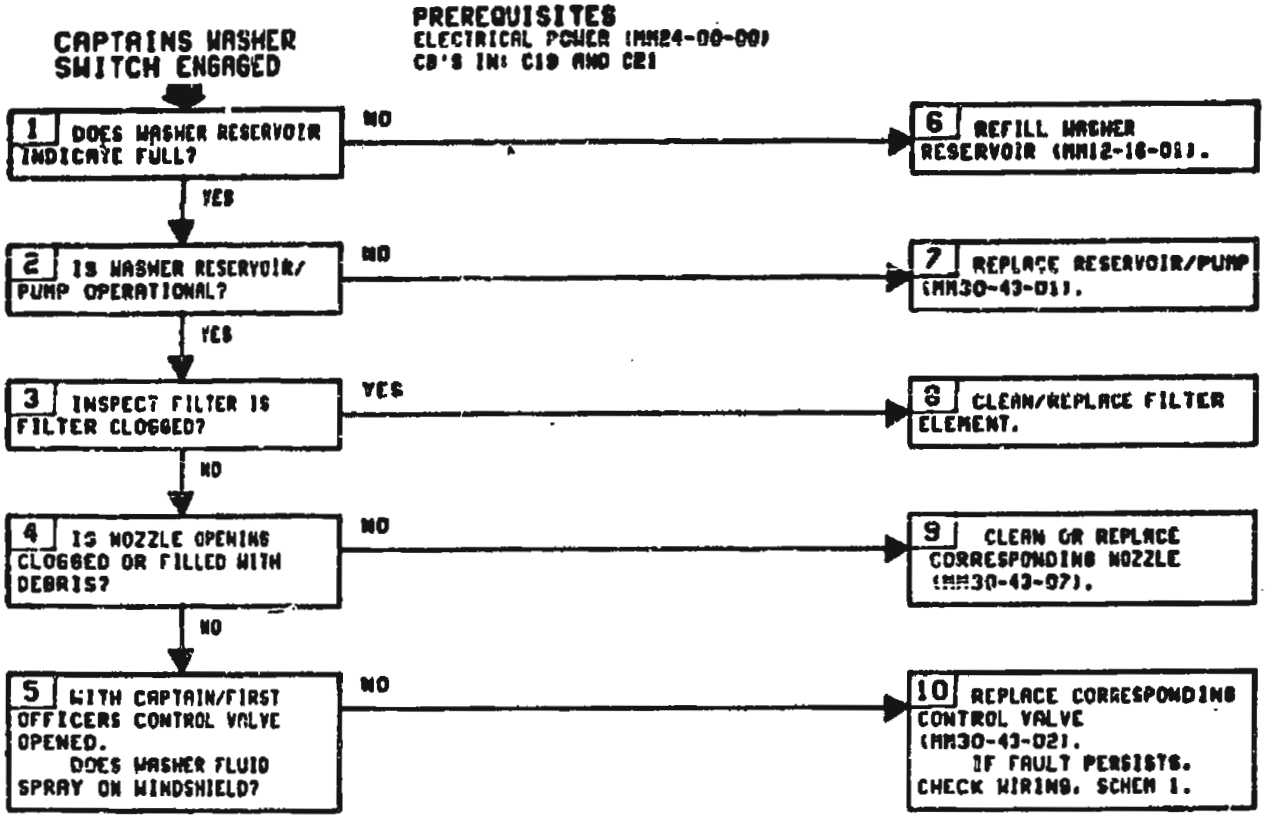
001B



R R Component Locator Diagram
Figure 102

R EFFECTIVITY: ALL

R R 001B


PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: C19 AND CE1
CAPTAINS WASHER SWITCH ENGAGED
1 DOES WASHER RESERVOIR INDICATE FULL?
NO
6 REFILL WASHER RESERVOIR (MM12-16-01).
YES
2 IS WASHER RESERVOIR/ PUMP OPERATIONAL?
NO
7 REPLACE RESERVOIR/PUMP (MM30-43-01).
YES
3 INSPECT FILTER IS FILTER CLOGGED?
YES
8 CLEAN/REPLACE FILTER ELEMENT.
NO
4 IS NOZZLE OPENING CLOGGED OR FILLED WITH DEBRIS?
NO
9 CLEAN OR REPLACE CORRESPONDING NOZZLE (MM30-43-07).
NO
5 WITH CAPTAIN/FIRST OFFICERS CONTROL VALVE OPENED. DOES WASHER FLUID SPRAY ON WINDSHIELD?
NO
10 REPLACE CORRESPONDING CONTROL VALVE (MM30-43-02). IF FAULT PERSISTS. CHECK WIRING. SCHEM 1.

WARNING

WHEN ELECTRICAL POWER IS ON THE AIRCRAFT CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SD PANEL CB2 MUST BE OPENED AND TAGGED.

WARNING

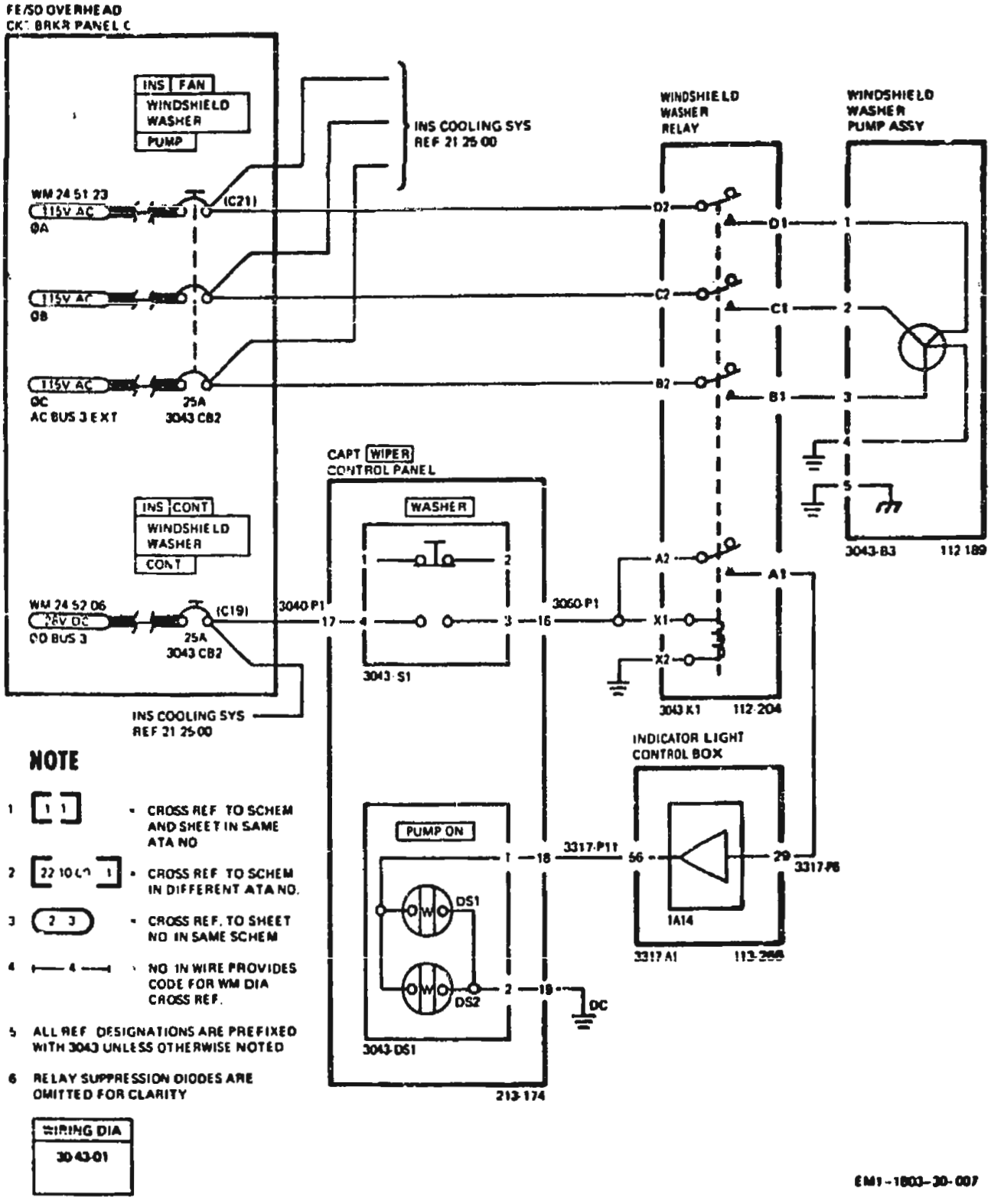
DO NOT ALLOW SKIN OR EYES TO COME IN CONTACT WITH WASHER FLUID. IMMEDIATELY FLUSH AFFECTED AREA WITH WATER.

CAUTION

DO NOT ALLOW WASHER FLUID TO DRY ON AIRCRAFT SURFACE. THOROUGHLY WASH WINDSHIELD AND SURROUNDING AREA WITH CLEAR WATER.

R1-0002-00-3019

R Insufficient Washer Fluid on Windshield
R Figure 103



NOTE

1. [1 1] - CROSS REF TO SCHEM AND SHEET IN SAME ATA NO
2. [22 10 C1 1] - CROSS REF TO SCHEM IN DIFFERENT ATA NO.
3. (2 3) - CROSS REF. TO SHEET NO IN SAME SCHEM
4. —— 4 —— - NO IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
5. ALL REF DESIGNATIONS ARE PREFIXED WITH 3043 UNLESS OTHERWISE NOTED
6. RELAY SUPPRESSION DIODES ARE OMITTED FOR CLARITY

WIRING DIA
30-43-01

EM1-1803-30-007

R R Windshield Washer System Schematic
SCHEM 1

R R 0018 EFFECTIVITY: ALL

WINDSHIELD WASHER SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

   24-41-00 External Power/Ground Service System - Maintenance Practices

   30-43-01 Reservoir/Pump - Servicing

2. Adjustment/Test

   A. Operational Test

R WARNING: AVOID SKIN AND EYE CONTACT WITH WASHER FLUID.

   (1) Turn on electrical power (Ref. 24-41-00).

   (2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that the following circuit breakers are closed:

R WINDSHIELD WASHER - CONT (C19)

R WINDSHIELD WASHER - PUMP (C21)

   (3) Verify that manual control valves, one on left side console and one on right side console, zone 210, are closed.

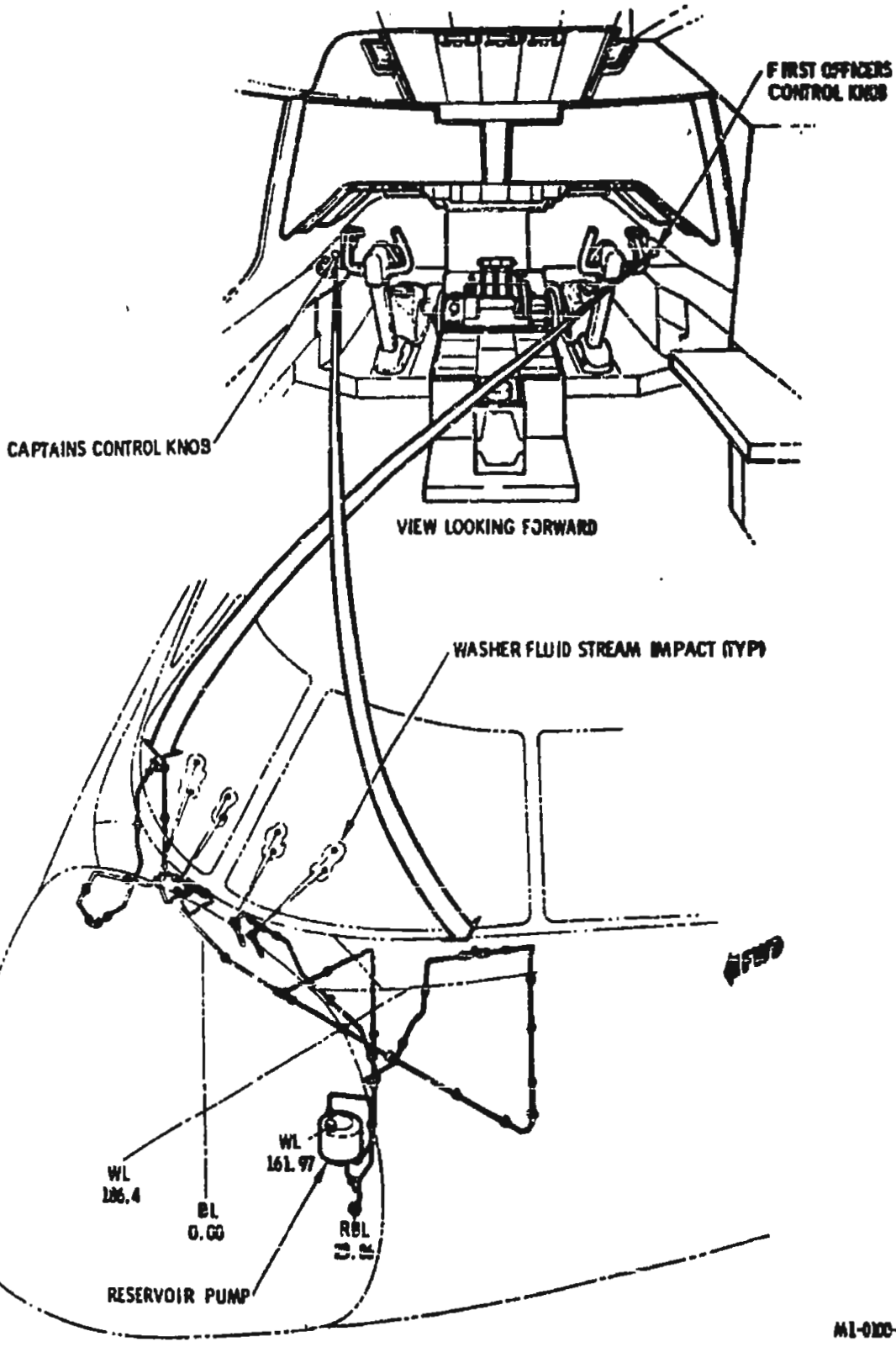
   (4) Check fluid level in reservoir/pump located on right
R side of forward electronic service center zone 112. Refill if less than half full (Ref. 30-43-01).

   (5) On Captains WIPER panel, zone 210, depress WASHER pushbutton switch and check that PUMP ON indicator light comes on.

R (6) On Captains left side console zone 210, open manual
R washer control valve. Verify that both nozzle head
R washer fluid impact are in line and approximately ten
R inches above the windshield lower edge. The washer
R fluid impact point for each nozzle spray forms a
R vertical oval pattern approximately two by four inches
R on impact (Ref. Figure 501).

R (7) Repeat Step 2A(6) on First Officers right side console,
R zone 210, and verify nozzle head washer fluid impact.

   (8) Close manual control valves.



R
R

Windshield Washer System
Figure 501

(9) Depress WASHER pushbutton switch.

R (10) Turn off electrical power (Ref. 24-41-00).

R (11) Thoroughly wash windshields and surrounding area with clear water.

RESERVOIR/PUMP - MAINTENANCE PRACTICES

1. Equipment and Materials

Filter Element, Task Corp, X10826, or equivalent

Filter Bowl Bushing, Task Corp, 20308-1, or equivalent

Filter Element Packing, NAS1593-012, or equivalent

Filter Bowl Packing, NAS1593-124, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

2. Referenced Procedure

12-16-01 Windshield Washer Reservoir Replenishing

30-43-00 Windshield Washer System - Adjustment and Test

3. Maintenance Practices

A. Filter Element and Filter Bowl Bushing Replacement

R WARNING: AVOID WASHER FLUID CONTACT WITH SKIN AND EYES.

(1) Drain windshield washer system (Ref. 12-16-01).

(2) Unscrew filter bowl (Ref. Fig. 201) and remove from filter housing.

(3) Remove packing from filter housing. Discard packing.

(4) Verify condition of bushing.

(a) Remove bushing from filter bowl.

(b) Wash and dry filter bowl and bushing.

(c) Verify that inside diameter of bushing is 1.035 inches or less. If greater than 1.035 inches, discard bushing.

(5) Remove filter packing from filter housing. Discard packing.

(a) Back flush filter with hot water.

(6) Lubricate new filter bowl packing with washer fluid and install packing in packing groove in filter housing.

R (7) Lubricate new filter element packing with washer fluid and install on new or cleaned filter element.

(8) Install filter element on filter housing.

R (9) Install filter bowl bushing in filter bowl.

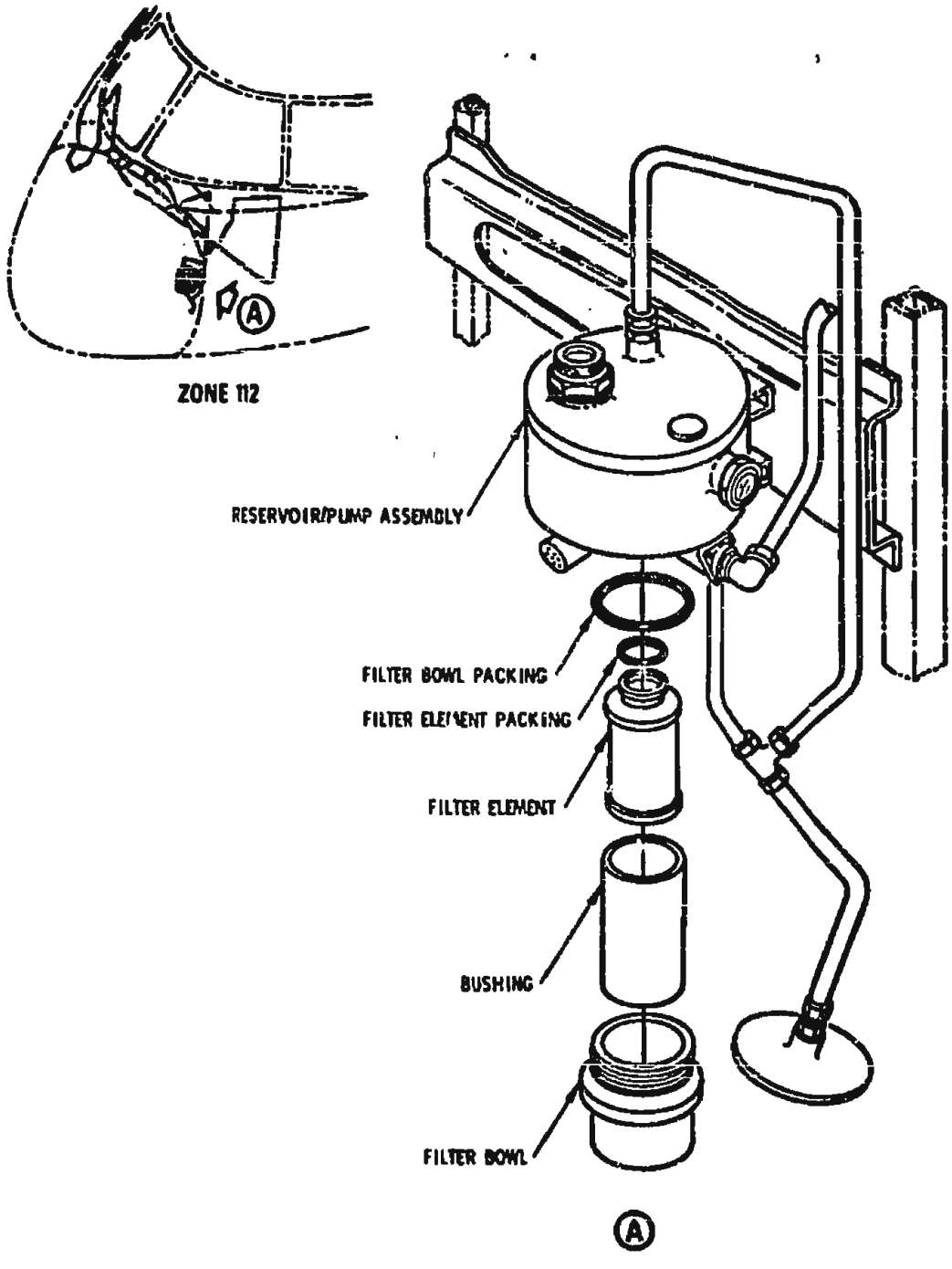
(10) Install filter bowl over filter element and screw into filter housing.

(11) Tighten filter bowl handtight and lockwire bowl to filter housing.

(12) Fill windshield washer system (Ref. 12-16-01).

(13) Verify operation of windshield washer system (Ref. 30-43-00).

(14) Check filter bowl for leaks.



M1-0100-30-145

R Reservoir/Pump Filter Replacement
R Figure 201

R EFFECTIVITY: ALL
R
0018

RESERVOIR/PUMP - REMOVAL AND INSTALLATION

1. Equipment and Materials

   O-rings (Ref. Fig. 401)

2. Referenced Procedures

   12-16-01 Windshield Washer Reservoir, Replenishing

   30-43-00 Windshield Washer System - Adjustment and Test

3. Removal/Installation

   A. Removal

      WARNING: AVOID SKIN AND EYE CONTACT WITH WASHER FLUID.

      (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers:

      WINDSHIELD WASHER - CONT (C19),

      WINDSHIELD WASHER - PUMP (C21).

      (2) Drain windshield washer system (Ref. 12-16-01).

      (3) Disconnect electrical connector from reservoir/pump.

      (4) Remove plumbing lines from reservoir/pump (Ref. Fig. 401).

      (5) Remove bolts attaching reservoir/pump to structure.

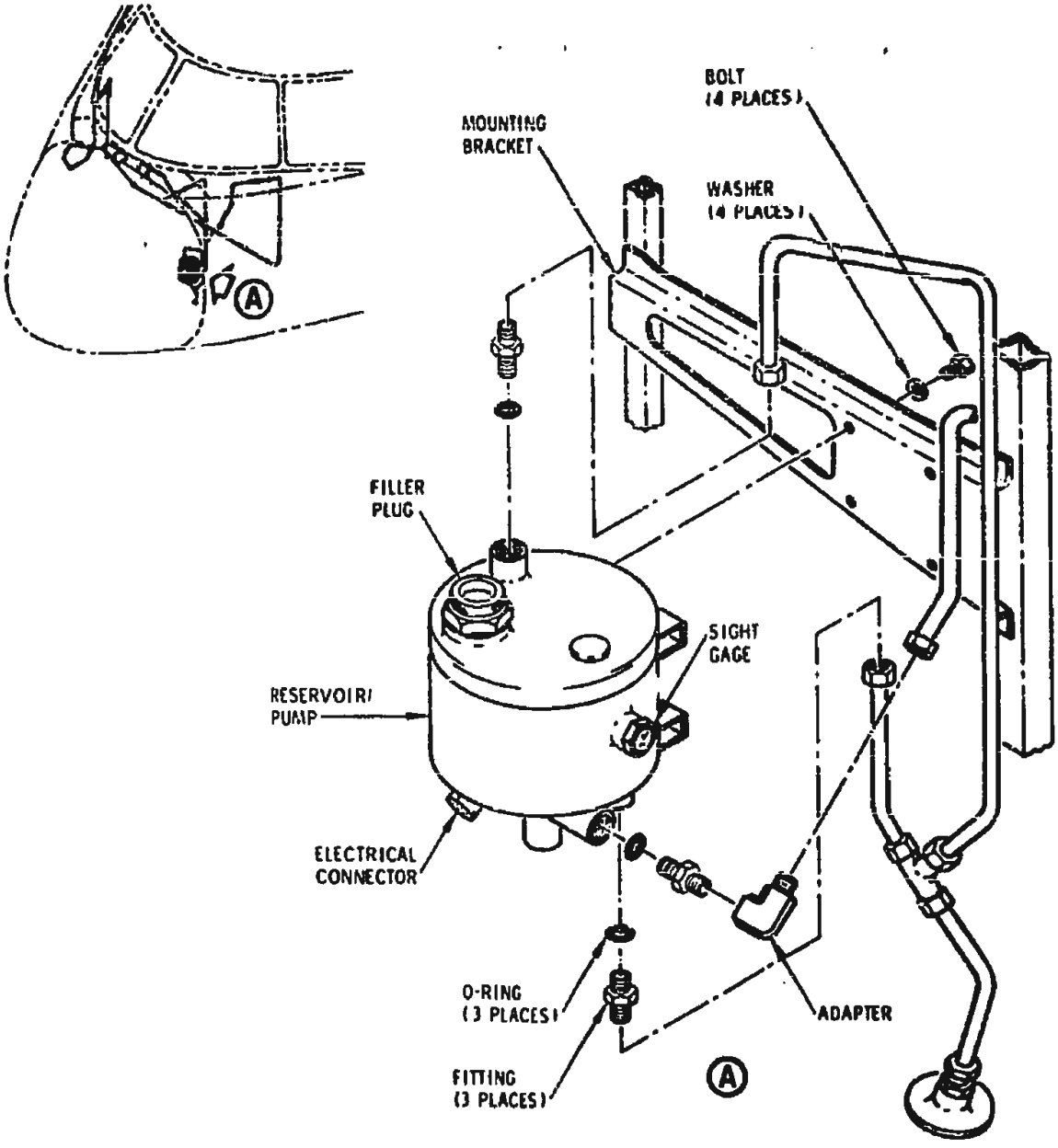
      (6) Remove adapter, fittings, and O-rings from reservoir/pump.

   B. Installation

      (1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

      (2) Install O-rings, fittings, and adapter on reservoir/pump.

      (3) Bolt reservoir/pump to structure.



R Reservoir/Pump - Removal and Installation
R Figure 401

(4) Connect plumbing lines.

(5) Connect electrical connector to reservoir/pump.

(6) Fill windshield washer system (Ref. 12-16-01).

(7) Remove tags and close circuit breakers opened in Step 3A(1).

(8) Test windshield washer system (Ref. 30-43-00).

CONTROL VALVE - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for the left and right windshield washer control valves. The control valves are located in the flight station, zone 210. One control valve is on the left side console and the other is on the right side console (Ref. Fig. 401).

2. Referenced Procedures

12-16-01	Windshield Washer Reservoir Replenishing
25-13-00	Flight Compartment Trim and Finish - Removal and Installation
30-43-00	Windshield Washer System - Adjustment and Test

3. Removal/Installation

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag the following circuit breakers:

R WINDSHIELD WASHER - CONT (C19)

R WINDSHIELD WASHER - PUMP (C21)

(2) Drain windshield washer system (Ref. 12-16-01).

(3) Loosen two set screws in control valve knob and remove knob.

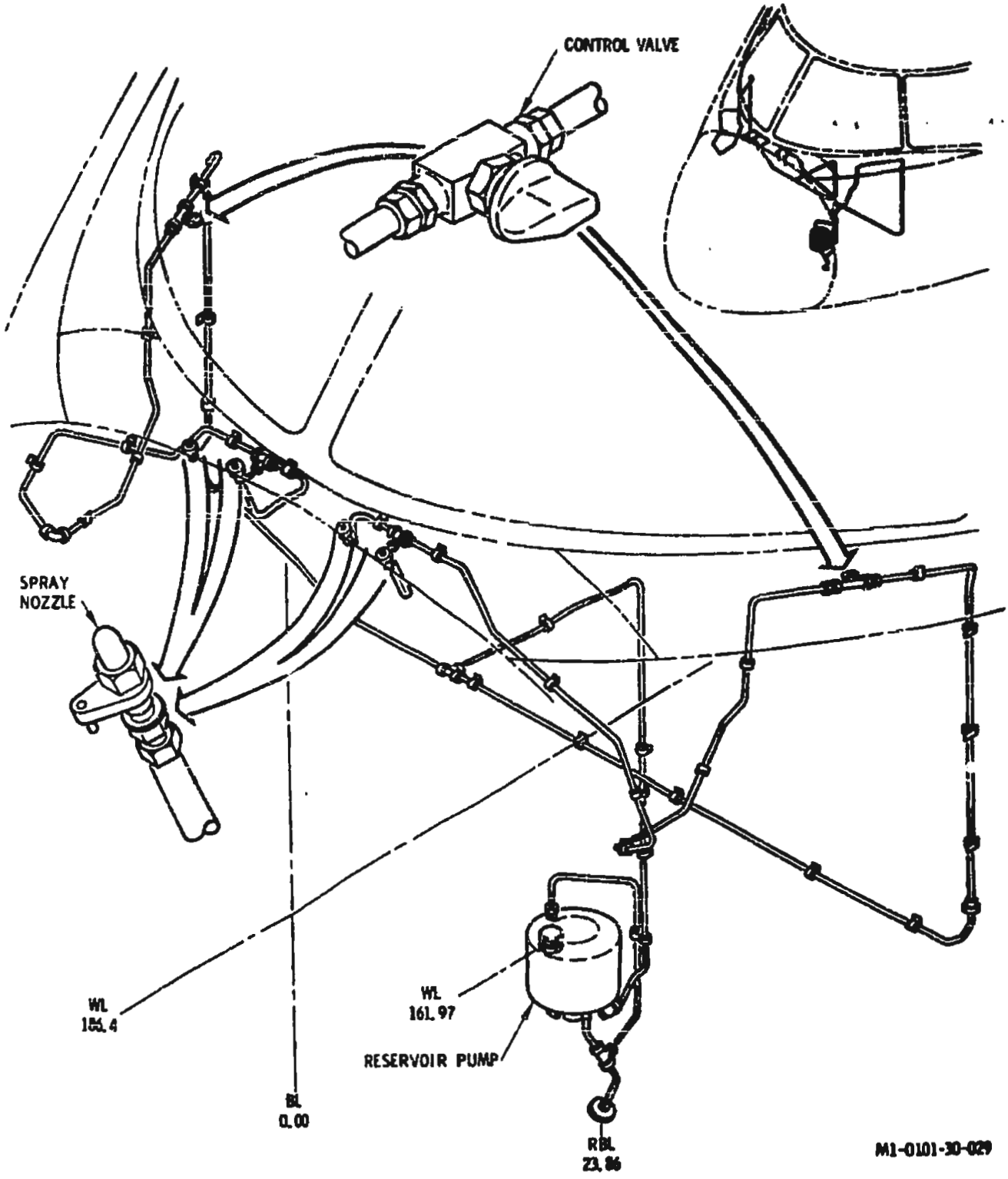
(4) Remove flight station trim panels around control valve (Ref. 25-13-00).

(5) Disconnect plumbing and remove control valve.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Connect plumbing to control valve.



R Windshield Washer System - Removal and Installation
R Figure 401

(3) Replace flight station trim panels (Ref. 25-13-00).

(4) Replace knob on control valve with pointer oriented correctly, and torque both set screws to 5 to 7 lb-in.

R (5) Replenish windshield washer system (Ref. 12-16-01).

R (6) Remove tags and close circuit breakers opened in Step
R 3A(1).

R (7) Test windshield washer system (Ref. 30-43-00).

SPRAY NOZZLE HEAD - REMOVAL AND INSTALLATION

1. General

R Removal and installation is the same for all windshield washer spray nozzle heads, zone 210, (Ref. Fig. 401).

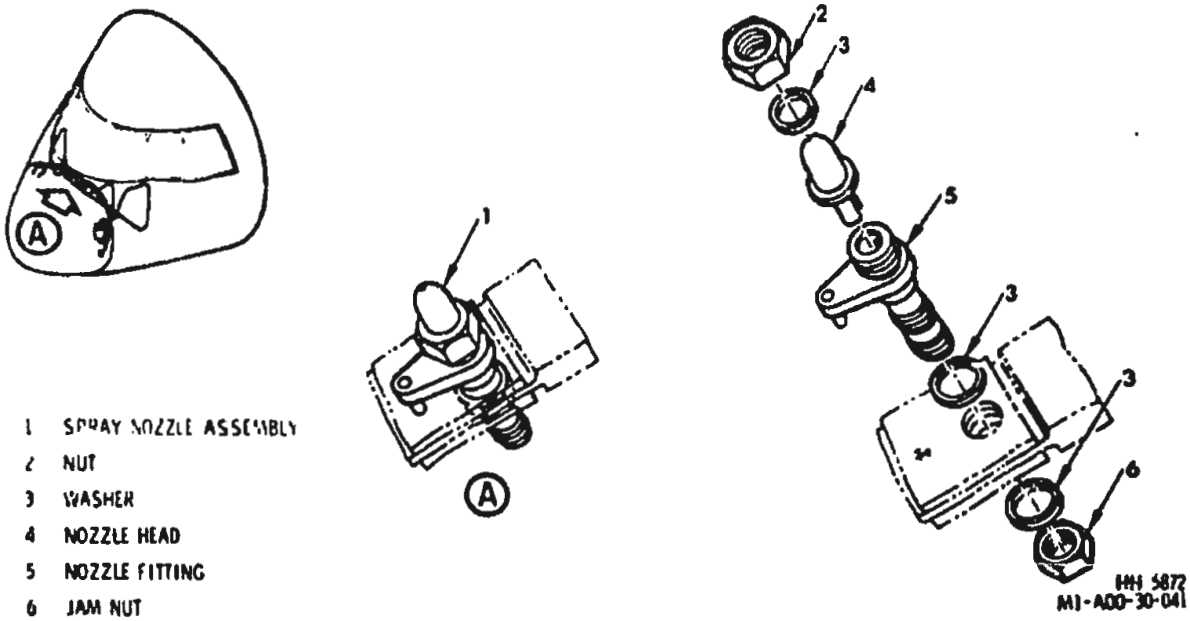
2. Removal/Installation

WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

R AVOID SKIN AND EYE CONTACT WITH WASHER FLUID.

A. Removal

R (1) At outside base of windshield, zone 210, remove nut and washer from spray nozzle head.



1 SPRAY NOZZLE ASSEMBLY
2 NUT
3 WASHER
4 NOZZLE HEAD
5 NOZZLE FITTING
6 JAM NUT

Spray Nozzle Heads
Figure 401

(2) Pull spray nozzle head out of fitting.

B. Installation

(1) Observe indexing and insert spray nozzle head into fitting.

(2) Install nut and washer and tighten.

(3) Lock-wire nut in place.

SPRAY NOZZLE HEAD - CLEANING

1. General

The following cleaning procedure is applicable for all windshield washer spray nozzle heads located at the base of the
R windshield, zone 210. Only the spray nozzle head requires removal for cleaning.

2. Referenced Procedures

30-43-00 Windshield Washer System - Adjustment and Test

30-43-07 Spray Nozzle Head - Removal and Installation

3. Cleaning/Painting

A. Spray Nozzle Head Cleaning

WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

R AVOID SKIN AND EYE CONTACT WITH WASHER FLUID.

(1) Remove spray nozzle head (Ref. 30-43-07).

(2) Clean out spray nozzle head openings with a 0.032-inch-maximum diameter wire. Blow out all debris.

(3) Install spray nozzle head (Ref. 30-43-07).

(4) Test windshield washer system (Ref. 30-43-00).

WINDSHIELD WIPER SYSTEM - DESCRIPTION AND OPERATION

1. General

The windshield wiper system is an electromechanical system that operates wiper blade assemblies on the left and right windshields. The system comprises two subsystems, one for the Captain and the other for the First Officer. Major components of the system are:

Two windshield wiper motor assemblies; one at the base of the left windshield and the other at the base of the right windshield, zone 210 (Ref. Fig. 1)

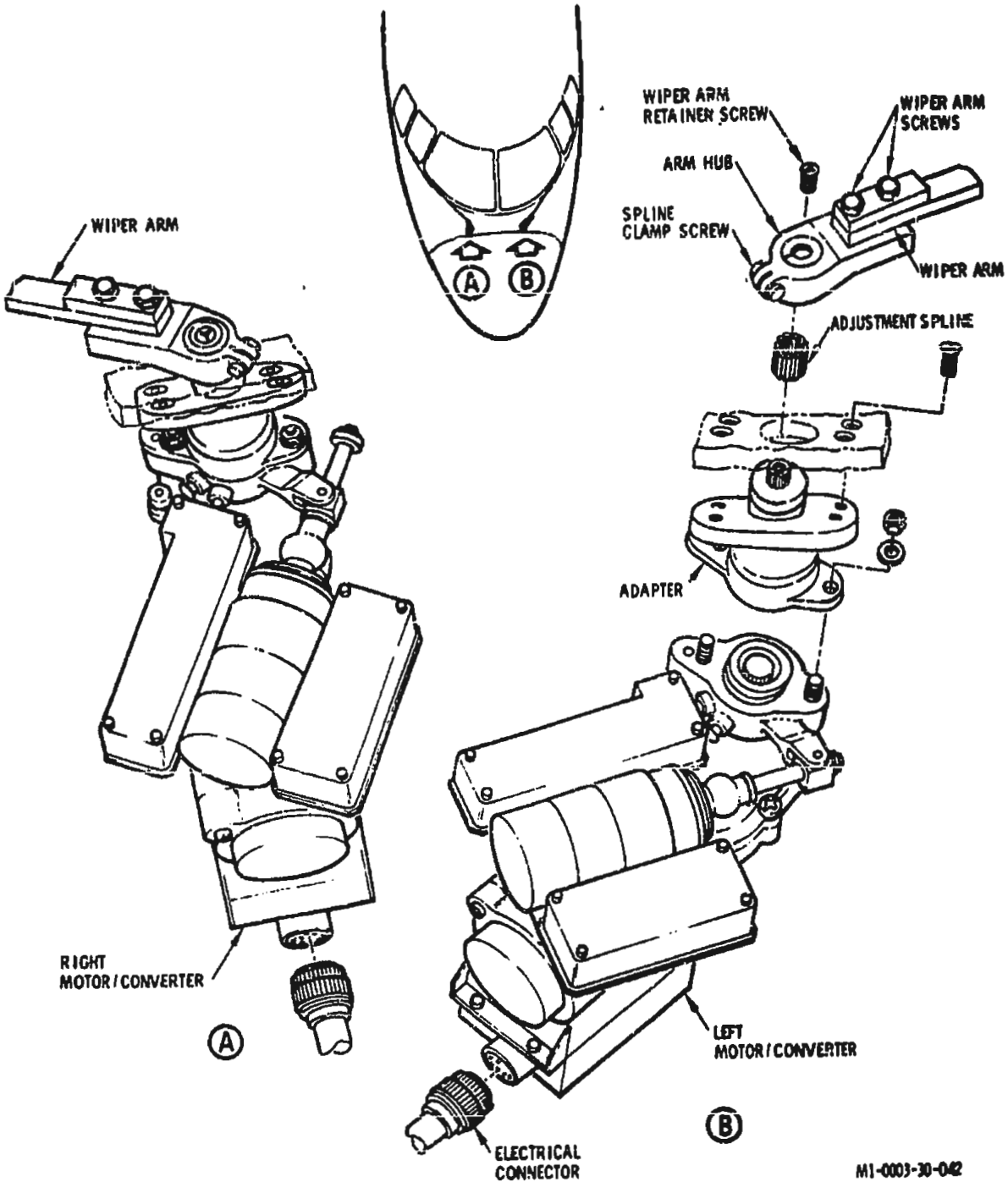
Two 3-position rotary control switches designated OFF-LOW-HIGH; one on the Captains WIPER panel and the other on the First Officers WIPER panel, zone 210

Two wiper blade arm assemblies; one each on the left and right windshield wiper drive shafts, zone 210

Each windshield wiper motor has a mechanical converter that converts the motor rotary action into an oscillatory motion. An adapter transfers the output of the converter through the aircraft skin to the windshield wiper arm assembly. A fine adjustment spline sleeve is used to position the wiper arm accurately on the adapter shaft.

When the OFF-LOW-HIGH switch is in the LOW position, the wiper motor assembly drives the wiper blade back and forth across the windshield at approximately 125 strokes per minute. In the HIGH position, the blade oscillations increase to approximately 250 strokes per minute. In the OFF position, a park motor drives the blade to a park position on the windshield surround structure off of the windshield.

Power to operate the Captains wiper motor is supplied by the 115V ac, 400 Hz, 3-phase essential bus through the CAPT WSHLD WIPER PWR circuit breaker. Control power for the Captains wiper motor is supplied by the 28V dc essential bus through the CAPT WSHLD WIPER CONT circuit breaker. Both circuit breakers are located on the Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215. Power to operate the First Officers wiper motor is supplied by 115V ac, 400 Hz, 3-phase ac
R bus No. 1 extension through the WINDSHIELD DEFOG & F/O WIPER PWR circuit breakers. Control power for the First Officers wiper motor is supplied by the 28V dc bus 1 through the F/O WIPER CONT circuit breaker. The circuit breakers are located on the Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215 (Ref. Fig. 2).

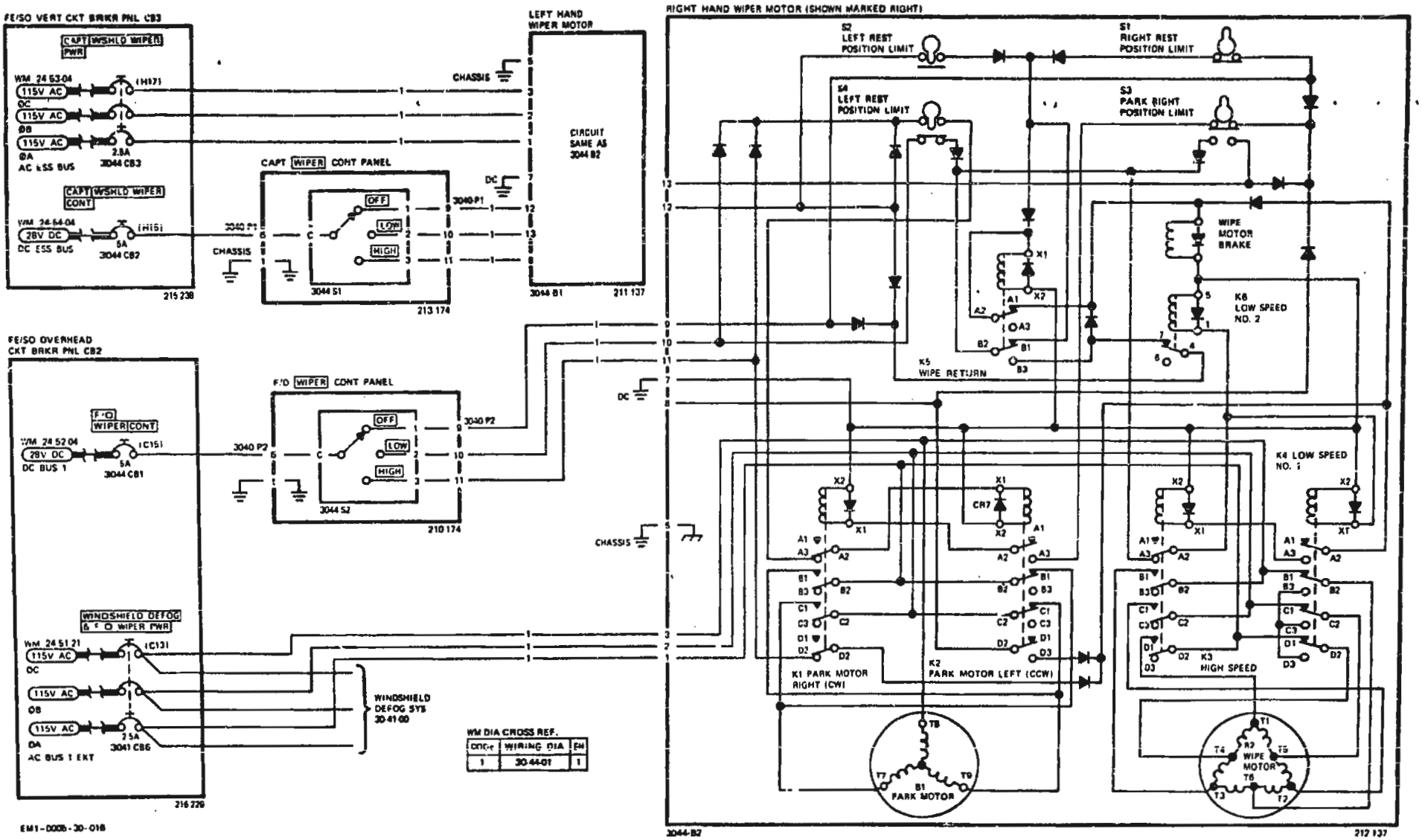


R
R

Windshield Wiper System
Figure 1

EFFECTIVITY: ALL

001B



EM1-0005-30-018

R
R

Windshield Wiper System Schematic
Figure 2

EFFECTIVITY: ALL

001B

2. Operation

Operation of the Captains windshield wiper and the First Officers windshield wiper are identical except for the routing of the 28V dc control voltage.

Operation of the motor-converter is controlled by the appropriate control switch, and limit switches S1 through S4. To facilitate understanding, only the operation of the Captains (left side) windshield wiper is described.

Placing the control switch in the LOW position applies 28V dc control voltage to J1-13. The control voltage is routed through the normally closed contacts of S3 and K2 contacts A2 - A3 to energize K1. Power is applied through K1 contacts to operate the park motor. The wiper blade is moved from the park position to the wipe position. In the wipe position, S3 transfers to close the normally open contacts, K1 is deenergized, and power is removed from the park motor. The control voltage is routed through the normally open contacts of S3 and through K5 to release the wiper motor blade. The control voltage also from S3 through K3 to energize K4. Power is applied through K4 contacts to operate the wiper motor at slow speed.

Moving the control switch to the HIGH position removes the control voltage from J1-13 and applies it to J1-8. When the control voltage is removed from J1-13, K4 deenergizes and power is removed from the low speed windings of the wiper position. The control voltage, when applied to J1-8 is routed through K2 contacts to release the wiper motor brake and to energize K3 through K4 contacts. When K3 is energized, power is applied to the high speed windings of the wiper motor.

Moving the control switch to the OFF position will cause one of two operations to occur depending on the position of S2. The cam operated switch S2 will normally be closed except when the wiper blade is in the rest position.

If S2 is closed when the control switch is placed in the OFF position, the control voltage is routed from J1-12 through S2 to energize K5. The control voltage is also routed through K5 contacts to keep the wiper motor brake released. Control voltage routed through another set of K5 contacts and K3 contacts energizes K4 to apply power to operate the wiper motor at low speed. Relay K6 is also energized but has no effect on the circuit. This operation continues until the wiper blade moves to the rest position and S2 opens. When S2 opens, relays K4 and K5 deenergize and the wiper motor brake is applied. Simultaneously, control voltage is applied, through S4 normally closed contacts and K1 contacts, to the coil of K2. Power is applied through K2 contacts to operate the park motor and drive the wiper to the park position. In the park position S4

transfers removing control voltage from K2 coil, deenergizing the relay and removing power from the park motor. At this point the system is completely deenergized.

If S2 is open when the control switch is moved to OFF, the wiper blade must complete one additional cycle before parking to assure parking in the proper position. Placing the control switch in OFF applies control voltage to J1-12. Relay K6 deenergizes very slowly and before it can transfer to the deenergized position the control voltage is routed through K6 contacts and both sets of K5 contacts to keep K4 and K6 energized. Power is maintained on the low speed windings of the wiper motor. This operation continues until the wiper blade moves out of the rest position and S2 closes. When S2 closes, parking is completed as previously described.

R # WINDSHIELD WIPER SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for troubleshooting windshield wiper system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is block 1.

R PREREQUISITES listed at the top of each diagram identify manditory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the windshield wiper system. It gives the area and access of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

R Table 101 is a list of all fault isolation data in this section of the manual.

Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
1-3	Windshield Wiper System Fault
SCHEM 1	Windshield Wiper System Schematic

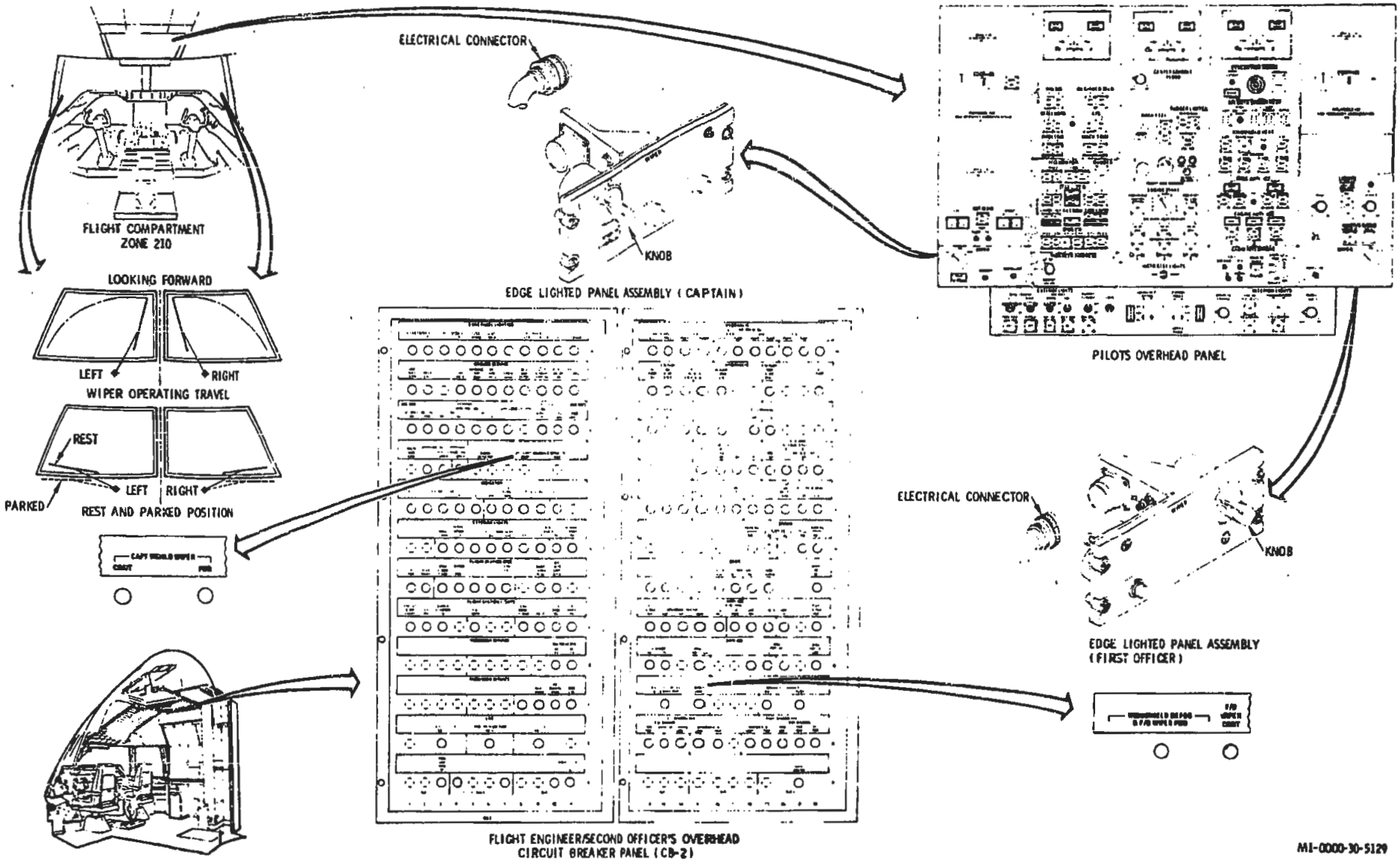
COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
CAPT WSHLD WIPER CONT (3044-CB2)	1	FLT STA/CB2 (J8)	*
CAPT WSHLD WIPER PWR (3044-CB3)	1	FLT STA/CB2 (J10)	*
WINDSHIELD DEFOG F/O WIPER PWR (3041-CB6)	1	FLT STA/CB2 (C13)	*
F/O WIPER CONT (3044-CB1)	1	FLT STA/CB2 (C15)	*
MOTOR/CONVERTER	2	PRESS BLKHD PNLS/111BZ, 111CZ	30-44-01 30-44-02
WINDSHIELD WIPER ARM	2	BASE OF WINDSHIELD/111	30-44-05
WINDSHIELD WIPER BLADE	2	BASE OF WINDSHIELD/111	30-44-07
WIPER CONTROL PANEL	2	FLT STA/PILOTS OVERHEAD PANEL	33-14-11

*SEE WM EQUIPMENT LIST

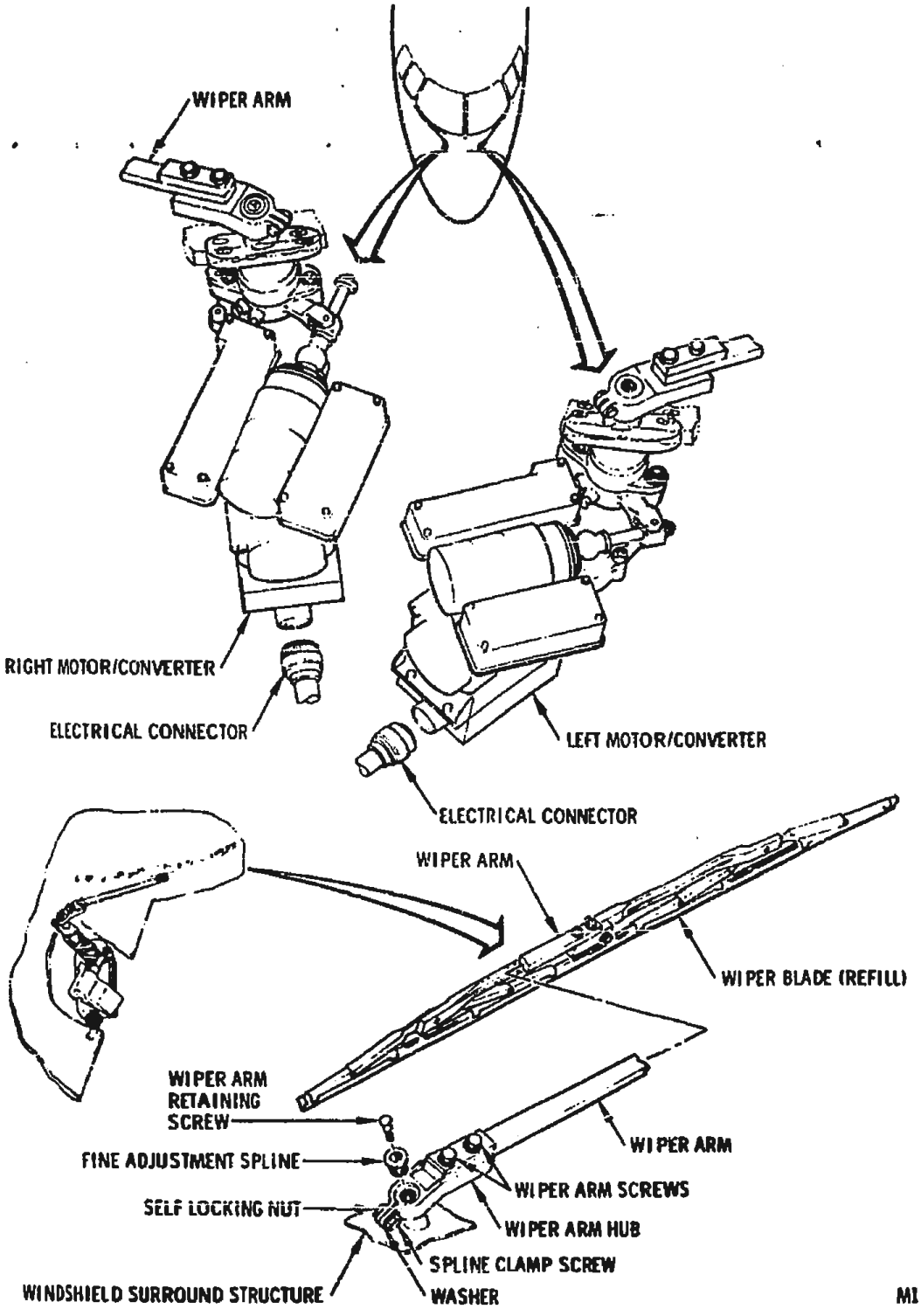
M1-0000-30-5131

Component Location Index
Figure 101

R EFFECTIVITY: ALL
R
001B



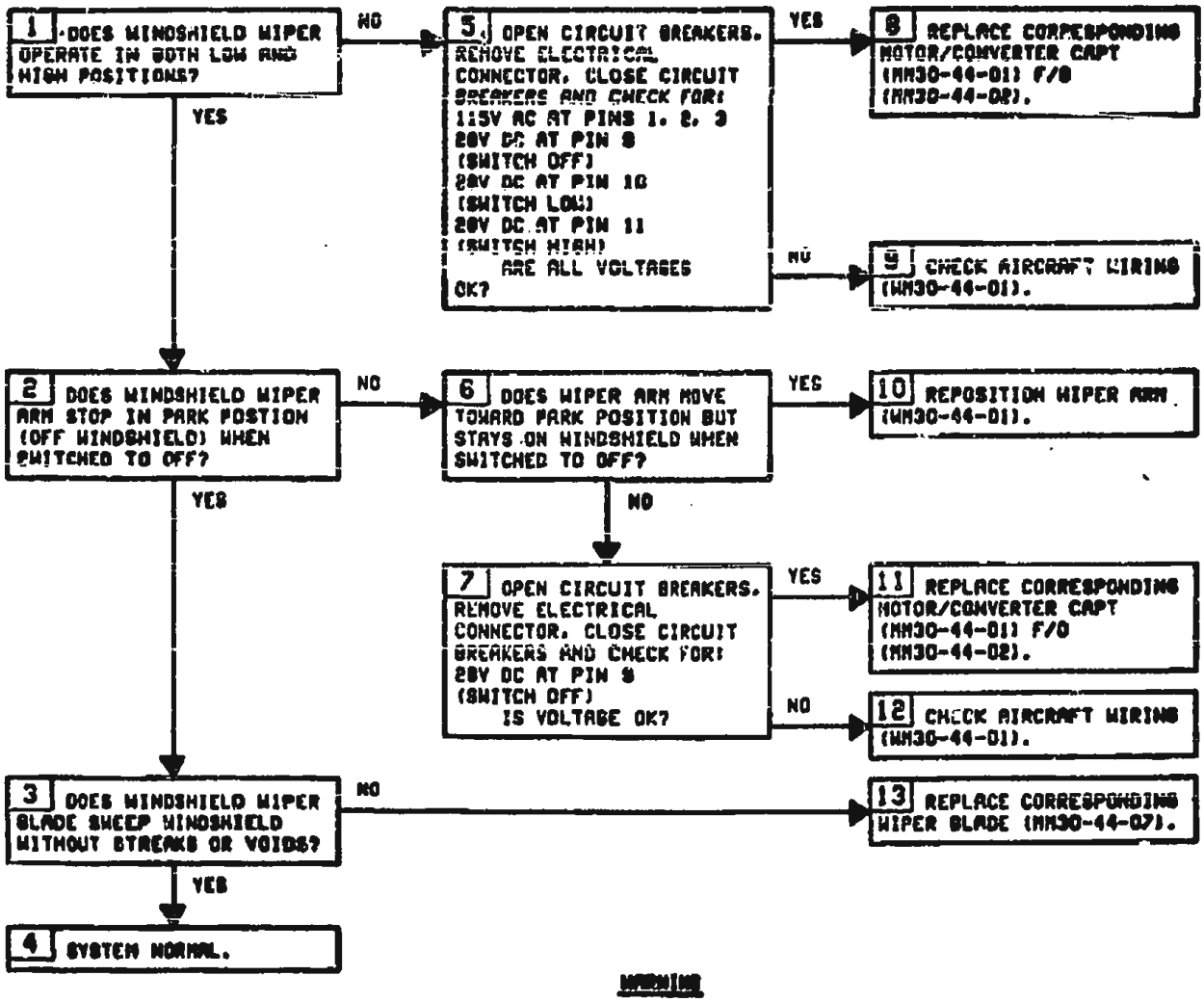
Component Locator Diagram
Figure 102 (Sheet 1)



R Component Locator Diagram
R Figure 102 (Sheet 2)

R EFFECTIVITY: ALL
R
001B

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: 2C13, 2C15, 3H19, 3H17


1 DOES WINDSHIELD WIPER OPERATE IN BOTH LOW AND HIGH POSITIONS?
NO
YES
5 OPEN CIRCUIT BREAKERS. REMOVE ELECTRICAL CONNECTOR. CLOSE CIRCUIT BREAKERS AND CHECK FOR: 115V AC AT PINS 1, 2, 3 28V DC AT PIN 8 (SWITCH OFF) 28V DC AT PIN 10 (SWITCH LOW) 28V DC AT PIN 11 (SWITCH HIGH) ARE ALL VOLTAGES OK?
YES
8 REPLACE CORRESPONDING MOTOR/CONVERTER CAPT (MM30-44-01) F/O (MM30-44-02).
NO
9 CHECK AIRCRAFT WIRING (MM30-44-01).
2 DOES WINDSHIELD WIPER ARM STOP IN PARK POSITION (OFF WINDSHIELD) WHEN SWITCHED TO OFF?
NO
6 DOES WIPER ARM MOVE TOWARD PARK POSITION BUT STAYS ON WINDSHIELD WHEN SWITCHED TO OFF?
YES
10 REPOSITION WIPER ARM (MM30-44-01).
YES
NO
7 OPEN CIRCUIT BREAKERS. REMOVE ELECTRICAL CONNECTOR. CLOSE CIRCUIT BREAKERS AND CHECK FOR: 28V DC AT PIN 8 (SWITCH OFF) IS VOLTAGE OK?
YES
11 REPLACE CORRESPONDING MOTOR/CONVERTER CAPT (MM30-44-01) F/O (MM30-44-02).
NO
12 CHECK AIRCRAFT WIRING (MM30-44-01).
3 DOES WINDSHIELD WIPER BLADE SWEEP WINDSHIELD WITHOUT STREAKS OR VOIDS?
NO
13 REPLACE CORRESPONDING WIPER BLADE (MM30-44-07).
YES
4 SYSTEM NORMAL.

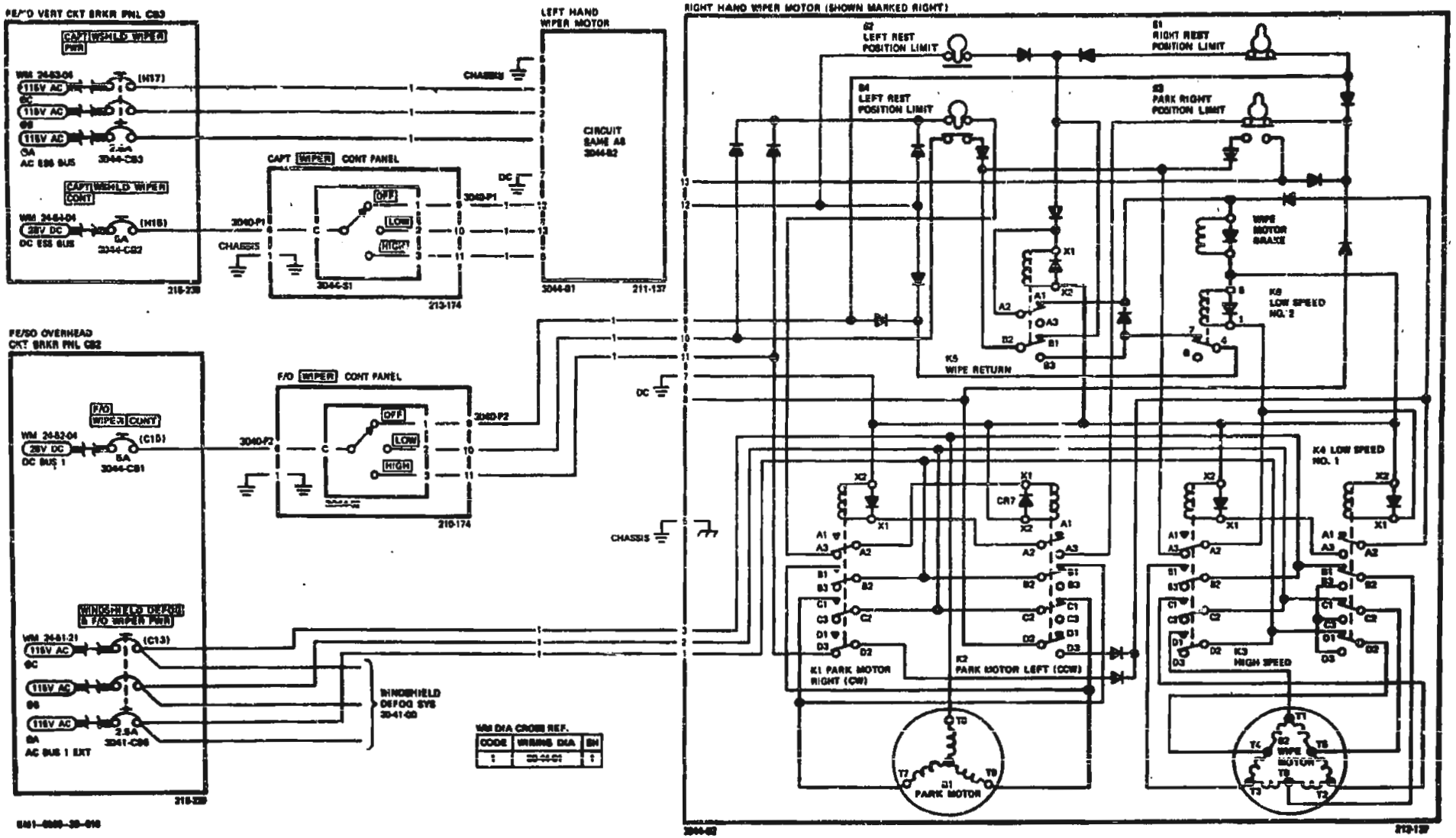
WARNING

WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18 AND B19 ON FE/80 PANEL C82 MUST BE OPENED AND TAGGED.

CAUTION

DO NOT OPERATE WINDSHIELD WIPERS ON A DRY WINDSHIELD.

Windshield Wiper System
Figure 103



Windshield Wiper System Schematic
SCHEM 1

R EFFECTIVITY: ALL
R
001B

WINDSHIELD WIPER SYSTEM - ADJUSTMENT AND TEST

1. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
30-43-00	Windshield Washer System - Adjustment and Test
30-44-05	Windshield Wiper Arm - Adjustment and Test

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-41-00).

(2) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, verify that circuit breakers CAPT - WHSLD WIPER - CONT (H-15) and CAPT - WHSLD WIPER - PWR (H-17) are closed.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breakers WINDSHIELD DEFOG - & F/O WIPER PWR (C-12) (C-13) (C-14) and F/O - WIPER - CONTROL (C-15) are closed.

(3) Turn on windshield washers to each windshield (Ref. 30-43-00).

R CAUTION: DO NOT OPERATE WINDSHIELD WIPERS ON A DRY
R WINDSHIELD.

(4) Turn OFF-LOW-HIGH switch on Captains WIPER panel, zone 210, to LOW and check that the wiper blade sweeps back and forth across the windshield.

(5) Turn OFF-LOW-HIGH switch to HIGH and check that the wiper blade speed increases (doubles).

(6) Turn OFF-LOW-HIGH switch to OFF and check that the wiper blade moves to the park position at the base of the windshield (Ref. 30-44-05).

(7) Repeat Steps 2A(4) through 2A(6) for First Officers WIPER panel, zone 210.

(8) Turn off windshield washers (Ref 30-43-00).

(9) Turn off electrical power (Ref. 24-41-00).

LEFT MOTOR/CONVERTER - REMOVAL AND INSTALLATION

1. General

The left motor/converter for the windshield wiper system is located behind the left access panel on the bulkhead behind the radome, zone 111.

2. Equipment and Materials

Protective caps

3. Referenced Procedures

6-50-00	Interior Access Doors and Removable Panels - Description and Operation
30-44-00	Windshield Wiper System - Adjustment and Test
53-11-01	FS 128 Bulkhead - Removal and Installation

4. Removal/Installation

R WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT
R THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC
R VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE
R THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE
R WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15,
R B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED
R AND TAGGED.

A. Removal

(1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers CAPT WSHLD WIPER CONT (H15) and PWR (H17).

(2) Manually pull windshield wiper down to full park position to eliminate system backlash.

(3) Open radome, zone 111.

(4) Remove left access panel, 111BZ (Ref. 6-50-00) at FS 128 bulkhead (Ref. 53-11-01).

(5) Disconnect electrical connector from motor/converter.

(6) Install protective caps on cable plug and motor/converter receptacle.

(7) Remove nuts and washers securing motor/converter to motor adapter.

(8) Lower motor/converter until studs and spline are disengaged from adapter.

B. Installation

(1) Verify that circuit breakers opened in Step 4A(1) are open and tagged.

(2) Remove protective caps and connect electrical connector to motor/converter.

NOTE: The motor/converter cannot be installed properly unless the windshield wiper is in the park position and the motor/converter is in the park position. Steps 4B(2) through 4B(5) will cause the motor/converter to drive to, or remain in, the proper park position.

(3) Place wiper control switch on Captains WIPER control panel in the OFF position.

R CAUTION: IF MOTOR IS NOT IN PARK POSITION, APPLICATION OF
R POWER WILL CAUSE MOTOR TO OPERATE TO PARK
R POSITION. SET MOTOR AWAY FROM ANY OBSTRUCTIONS
R BEFORE CLOSING CIRCUIT BREAKERS.

(4) Close circuit breakers opened in Step 4A(1) without removing tags.

(5) Open circuit breakers if motor/converter does not run, or after it stops running.

(6) With windshield wiper in park position, install motor/converter spline and studs in motor adapter. Install washers and nuts.

(7) Remove tags and close circuit breakers opened in Step 4A(1).

(8) Verify windshield wiper operation (Ref. 30-44-00).

(9) Install access panel, 1118Z, at FS 128 bulkhead (Ref. 53-11-01).

(10) Close and secure radome.

RIGHT MOTOR/CONVERTER - REMOVAL AND INSTALLATION

1. General

The right motor/converter for the windshield wiper system is located behind the right access panel on the bulkhead behind the radome, zone 111.

2. Equipment and Materials

Protective caps

3. Referenced Procedures

6-50-00	Interior Access Doors and Removable Panels - Description and Operation
30-44-00	Windshield Wiper System - Adjustment and Test
53-11-01	FS 128 Bulkhead - Removal and Installation

4. Removal/Installation

R WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT
R THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC
R VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE
R THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE
R WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15,
R B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED
R AND TAGGED.

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers WINDSHIELD DEFOG & F/O WIPER PWR (C13) and F/O WIPER CONT (C15).

(2) Manually pull windshield wiper arm down to full park position to eliminate systems backlash.

(3) Open radome, zone 111.

(4) Remove right access panel, 111CZ (Ref. 6-50-00) at FS 128 bulkhead (Ref. 53-11-01).

(5) Disconnect electrical connector from motor/converter.

(6) Install protective caps on cable plug and motor/converter receptacle.

(7) Remove nuts and washers securing motor/converter to motor adapter.

(8) Lower motor/converter until studs and spline are disengaged from adapter.

B. Installation

(1) Verify that circuit breakers opened in Step 4A(1) are open and tagged.

(2) Remove protective caps and connect electrical connector to motor/converter.

NOTE: The motor/converter cannot be installed properly unless the windshield wiper is in the park position and the motor/converter is in the park position. Steps 4B(2) through 4B(5) will cause the motor/converter to drive to, or remain in, the proper park position.

(3) Place wiper control switch on First Officers WIPER control panel in the OFF position.

R CAUTION: IF MOTOR IS NOT IN PARK POSITION APPLICATION OF
R POWER WILL CAUSE MOTOR TO OPERATE TO PARK
R POSITION. SET MOTOR AWAY FROM ANY OBSTRUCTION
R BEFORE CLOSING CIRCUIT BREAKERS.

(4) Close circuit breakers opened in Step 4A(1) without removing tags.

(5) Open circuit breakers if motor/converter does not run, or after it stops running.

(6) With windshield wiper in park position, install motor/converter spline and studs in motor adapter. Install washers and nuts.

(7) Remove tags and close circuit breakers opened in Step 4A(1).

(8) Verify windshield wiper operation (Ref. 30-44-00).

(9) Install access panel, 111CZ, at FS 128 bulkhead (Ref. 53-11-01).

(10) Close and secure radome.

MOTOR ADAPTER - REMOVAL AND INSTALLATION

1. General

The windshield wiper motor adapters are installed behind the access panels in the FS 128 bulkhead behind the radome, zone 111. For left motor adapter removal and installation refer to Steps 4A(1) and 4B(1), respectively. For right motor adapter removal and installation refer to Steps 4A(2) and 4B(2), respectively.

2. Equipment and Materials

Environmental Seal, LAC Spec C-40-769, Type I, or equivalent

3. Referenced Procedures

30-44-01 Left Motor/Converter - Removal and Installation

30-44-02 Right Motor/Converter - Removal and Installation

R WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT
R THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC
R VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE
R THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE
R WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15,
R B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED
R AND TAGGED.

4. Removal/Installation

A. Removal

(1) Perform the following steps to remove the left motor adapter:

(a) Remove left motor/converter (Ref. 30-44-01).

(b) Remove left wiper arm and wiper blade from left motor adapter.

(c) Remove bolts securing motor adapter to fuselage.

(2) Perform the follcwing steps to remove the right motor adapter:

(a) Remove right motor/converter (Ref. 30-44-02).

(b) Remove right wiper arm and wiper blade from right motor adapter.

(c) Remove bolts securing motor adapter to fuselage.

B. Installation

(1) Perform the following steps to install the left motor adapter:

(a) Install motor adapter with environmental seal and mounting bolts.

(b) Install left motor/converter (Ref. 30-44-01); install wiper arm and blade on motor adapter and rig for park position before closing circuit breakers and checking installation.

(2) Perform the following steps to install the right motor adapter:

(a) Install motor adapter with environmental seal and mounting bolts.

(b) Install right motor/converter (Ref. 30-44-02); install wiper arm and blade on motor adapter and rig for park position before closing circuit breakers and checking installation.

WINDSHIELD WIPER ARM - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for both windshield wiper arms located at the base of the windshield, zone 111. Referenced circuit breakers are different for the left and right windshield wiper arms. Only the circuit breakers associated with the wiper arm to be removed require opening.

2. Referenced Procedures

24-41-00	External Power/Ground Service System - Maintenance Practices
30-44-05	Windshield Wiper System - Adjustment and Test
30-44-07	Windshield Wiper Blade - Removal and Installation

3. Removal/Installation

WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

A. Removal

(1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers CAPT WSHLD WIPER CONT (H15) and PWR (H17) (left wiper arm).

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers WINDSHIELD DEFOG & F/O WIPER PWR (C13) and F/O WIPER CONT (C15) (right wiper arm).

(2) Manually pull down on wiper arm until blade is in proper park position.

(3) Loosen wiper arm screws.

(4) Loosen spline clamp screw.

(5) Remove wiper arm retainer screw and washer. Pull wiper arm off adapter shaft.

(6) Remove bolt, washer, and nut attaching blade to wiper arm (Ref. 30-44-07).

B. Installation

(1) Verify that circuit breakers open in Step 3A(1) are open and tagged.

R (2) Attach wiper blade to wiper arm with bolt, washer and
R nut. Tighten nut until just snug against wiper blade.
R Do not over tighten. Wiper blade must be free to
R rotate.

CAUTION: VERIFY MACHINED SPLIT WASHER IS INSTALLED IN WIPER ARM HUB.

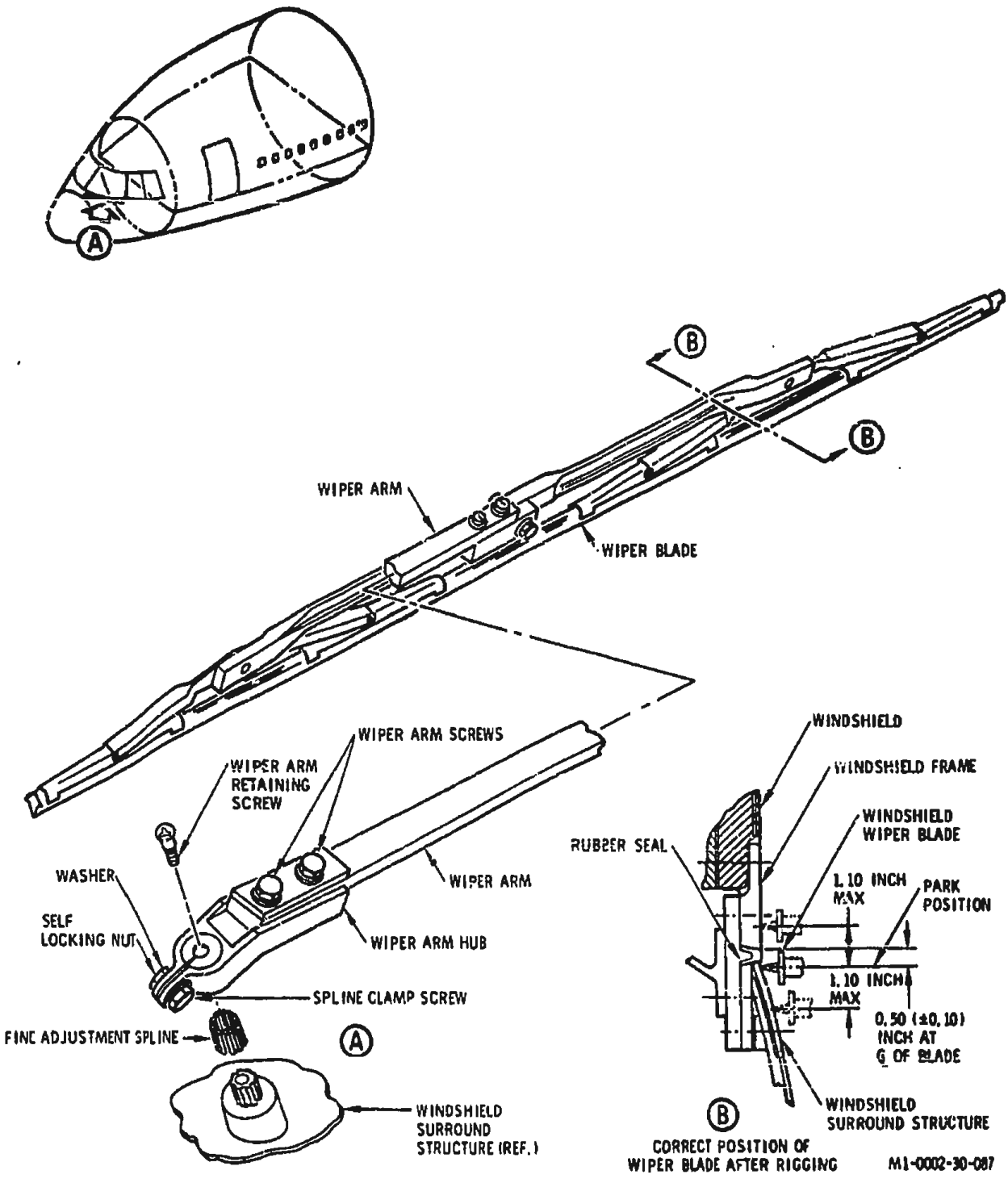
(3) Install wiper arm in park position, install wiper arm retaining screw and tighten spline clamp screw (Ref. Fig. 401).

(4) Remove tags and close circuit breakers opened in Step 3A(1).

(5) Turn on electrical power (Ref. 24-41-00).

(6) Verify operation of windshield wiper system by operating the windshield washer and wiper. Verify park position of wiper (Ref. 30-44-05).

(7) Turn off electrical power (Ref. 24-41-00).



R R Windshield Wiper Arm - Removal and Installation
Figure 401

WINDSHIELD WIPER ARM - ADJUSTMENT AND TEST

1. Adjustment/Test

WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

A. Rigging Instructions - Park Position

(1) Loosen wiper arm screws (Ref. Fig. 501).

(2) Loosen spline clamp screw.

(3) Remove wiper arm retaining screw.

(4) Place wiper arm on adapter spline so that blade is positioned within 1.10 inches of park position.

(5) Mark relative position of adapter shaft, adjustment spline, and wiper arm hub.

(6) Remove adjustment spline from wiper arm hub.

NOTE: Adjustment spline has a female spline to mate with adapter shaft and a male spline to mate with wiper arm hub.

(7) Rotate adjustment spline in direction opposite to direction wiper arm must move to be in park position (Ref. Table 501).

(8) Replace adjustment spline in arm hub at new position.

(9) Tighten spline clamp screw.

R R CAUTION: VERIFY MACHINED SPLIT WASHER IS INSTALLED IN WIPER ARM HUB.

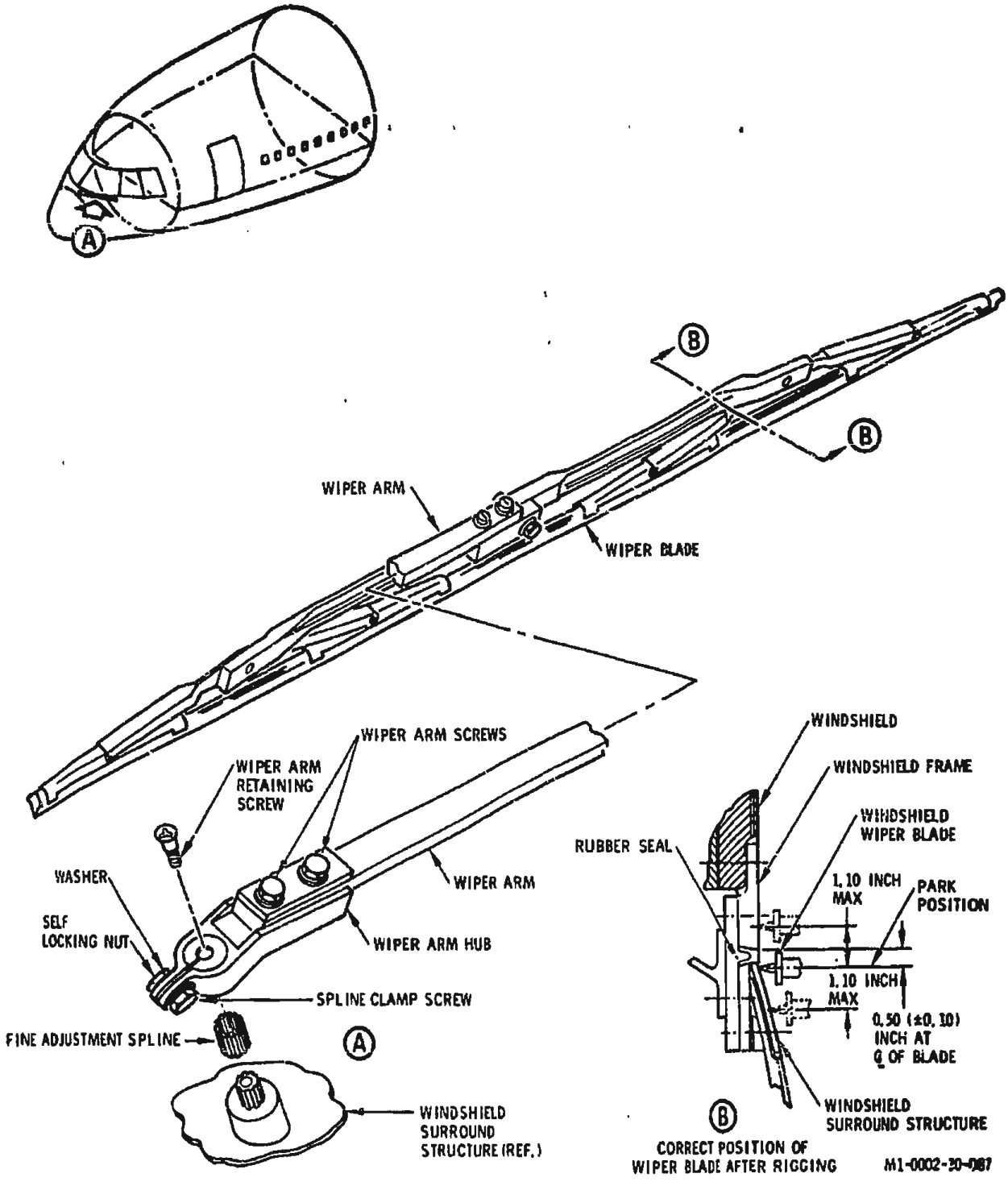
(10) Install wiper arm retaining screw.

(11) Tighten wiper arm screws.

(12) Verify operation of windshield wiper system by operating windshield washer and wiper. Verify park position of wiper.

Fine Adjustment
Table 501

DISTANCE (D) FROM STEP 3 STARTING POINT TO PARK POSITION (TARGET) IN INCHES	NUMBER (N) OF TEETH ROTATION REQUIRED AT INNER (64-TOOTH) SPLINE TO PRODUCE BLADE ADJUSTMENT
1.10	2
1.00	56
0.90	41
0.80	31
0.70	21
0.60	6
0.50	60
0.40	50
0.30	35
0.20	25
0.10	10



R Windshield Wiper Arm Rigging Adjustments
R Figure 501

EFFECTIVITY: ALL

001B

WINDSHIELD WIPER BLADE - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedures are applicable for both windshield wiper blades located at the base of the windshield, zone 111. Referenced circuit breakers are different for the left and right windshield wiper blades. Only the circuit breakers associated with the windshield wiper blade to be removed require opening.

To facilitate changing the windshield wiper blade, the wiper blade assembly is removed from the wiper arm. The blade may be replaced at a more convenient location.

2. Referenced Procedure

24-41-00 External Power/Ground Service Systems - Maintenance Practices

3. Removal/Installation

WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15, B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED AND TAGGED.

A. Removal of Windshield Wiper Blade Assembly

(1) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breakers CAPT WSHLD WIPER CONT (H15) and WIPER PWR (H17) (left wiper blade).

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers WINDSHIELD DEFOG & F/O WIPER PWR (C13) and F/O WIPER CONTROL (C15) (right wiper blade).

(2) Remove bolt, washer, and nut attaching wiper blade assembly to wiper arm.

B. Installation of Windshield Wiper Blade Assembly

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Hold wiper blade assembly against wiper arm. Install
R bolt, washer, and nut. Tighten nut until just snug
R against wiper blade. Do not over tighten. Wiper blade
R must be free to rotate.

(3) Remove tags and close circuit breakers opened in Step 3A(1).

(4) Turn on electrical power (Ref. 24-41-00).

(5) Check installation by turning on windshield washer and windshield wiper.

(6) Turn off electrical power (Ref. 24-41-00).

C. Replacement of Windshield Wiper Blade

(1) With wiper blade assembly removed from aircraft, use pliers to bend down raised corners of one end clip.

(2) Press upward on end clip to release clip indents from hole in end of each retaining strip.

(3) Slide clip out of blade holder. Discard clip.

(4) Repeat Steps C(1) through C(3) at other end clip.

(5) Remove both retaining strips from holder to release wiper blade. Discard retaining strips and blade.

(6) While holding new wiper in position in blade assembly, insert two new retaining strips through bridges of assembly.

(7) Insert new end clip between top section of wiper and retaining strips. Verify that indents in end clip locate in holes in retaining strips.

(8) Bend corners of end clip upward approximately 20 degrees to lock clip in place.

(9) Install end clip at other end of assembly per Steps C(7) and C(8).

WINDSHIELD WIPER BLADE - INSPECTION AND CHECK

1. Referenced Procedure

30-44-07 Windshield Wiper Blade - Removal and Installation

2. Inspection/Check

R WARNING: WHEN ELECTRICAL POWER IS ON THE AIRCRAFT, CURRENT
R THROUGH THE HEATER FILM WILL INDUCE AN ELECTRIC
R VOLTAGE ON THE OUTER GLASS ANTI-STATIC COATING. WHERE
R THERE IS A POSSIBILITY OF PHYSICAL CONTACT WITH THE
R WINDSHIELD PANEL OUTER GLASS, CIRCUIT BREAKERS B15,
R B16, B18, AND B19 ON FE/SO PANEL CB2 MUST BE OPENED
R AND TAGGED.

A. Inspection

(1) Verify that there are no cracks, damage or signs of deteriation on wiper blade. Bend back blade to inspect narrow center section. Replace wiper blade if damaged (Ref. 30-44-07).

(2) Verify that there are no cracks, damage, or distortion in metal parts of wiper blade assembly. Replace assembly if damaged.

(3) Check security of pins of all pivot points of wiper blade assembly. Replace assembly if all pivot pins are not secure.

VHF ANTENNA ANTI-ICE SYSTEM - DESCRIPTION AND OPERATION

R NOTE: Aircraft with SB30-043, and 032-999,
R the VHF Antenna Anti-Ice System is removed.

R 1. General

The No. 1 VHF antenna (Ref. 23-33-00) located on the upper fuselage at FS 485 is anti-iced, while airborne, by engine bleed air obtained from the No. 2 pack and No. 3 pack bleed air ducts (Ref. 21-21-00). Bleed air from the No. 2 pack and No. 3 pack ducts is tapped off and ducted to two anti-ice shutoff valves whose outputs are T-connected to a single duct leading into the VHF antenna (Ref. Fig 1). Bleed air flows through the antenna and vents to atmosphere. Because it is hot, bleed air prevents ice formation on the antenna.

An indicator light, with the legend VHF ANT ANTI-ICE is provided on the Flight Engineer/Second Officers annunciator panel, zone 215. The light will only be on if the VHF anti-ice system is completely inoperative because the bleed airflow through only one valve is sufficient to anti-ice the antenna.

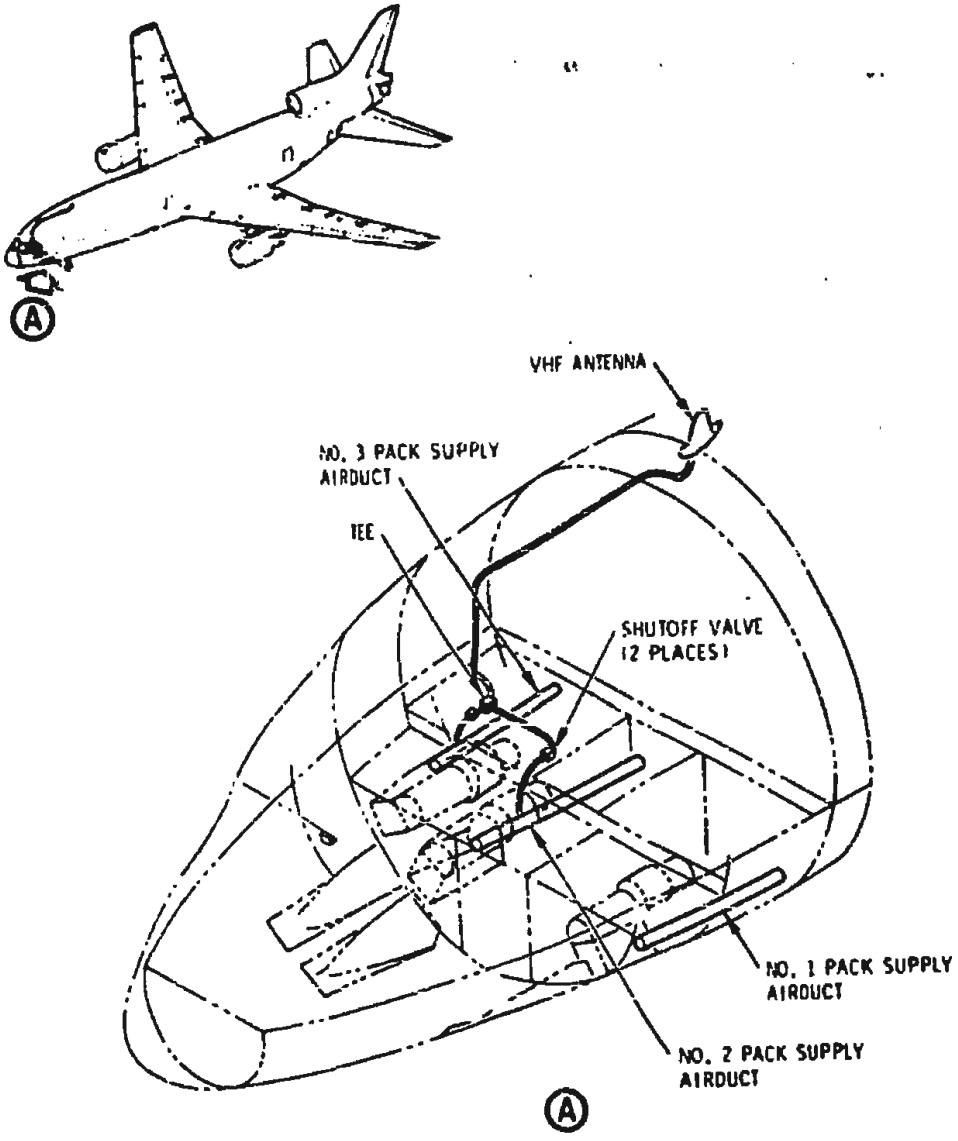
The VHF antenna anti-ice system is kept inoperative on the ground by the automatic switching of the air/ground sensing relay (Ref. 32-63-00).

2. Operation

When the ENG NO. 2 ANTI-ICE switchlight is depressed (ON legend illuminated) (Ref. 30-21-00) and the aircraft is airborne, power is applied through the air/ground sensing relay contacts (Ref. 32-63-00) to the inputs of the No. 2 and No. 3 pack flow control valve switchlights (Ref. Fig 2). When the NO. 2 PACK FLOW CONTROL switchlight is depressed (flow bar on), power is applied to the VHF antenna anti-ice No. 2 system shutoff valve. When the NO. 3 PACK FLOW CONTROL switchlight is depressed (flow bar on), power is applied to the VHF antenna anti-ice No. 3 system shutoff valve.

Application of power to the shutoff valves from the No. 2 and No. 3 pack flow control switchlights drives the shutoff valves to the open position, allowing bleed air to flow to the VHF antenna.

When the No. 2 and No. 3 pack flow control valve switchlights are released (flow bar off) the shutoff valves are driven to the closed position, shutting off bleed air to the VHF antenna.



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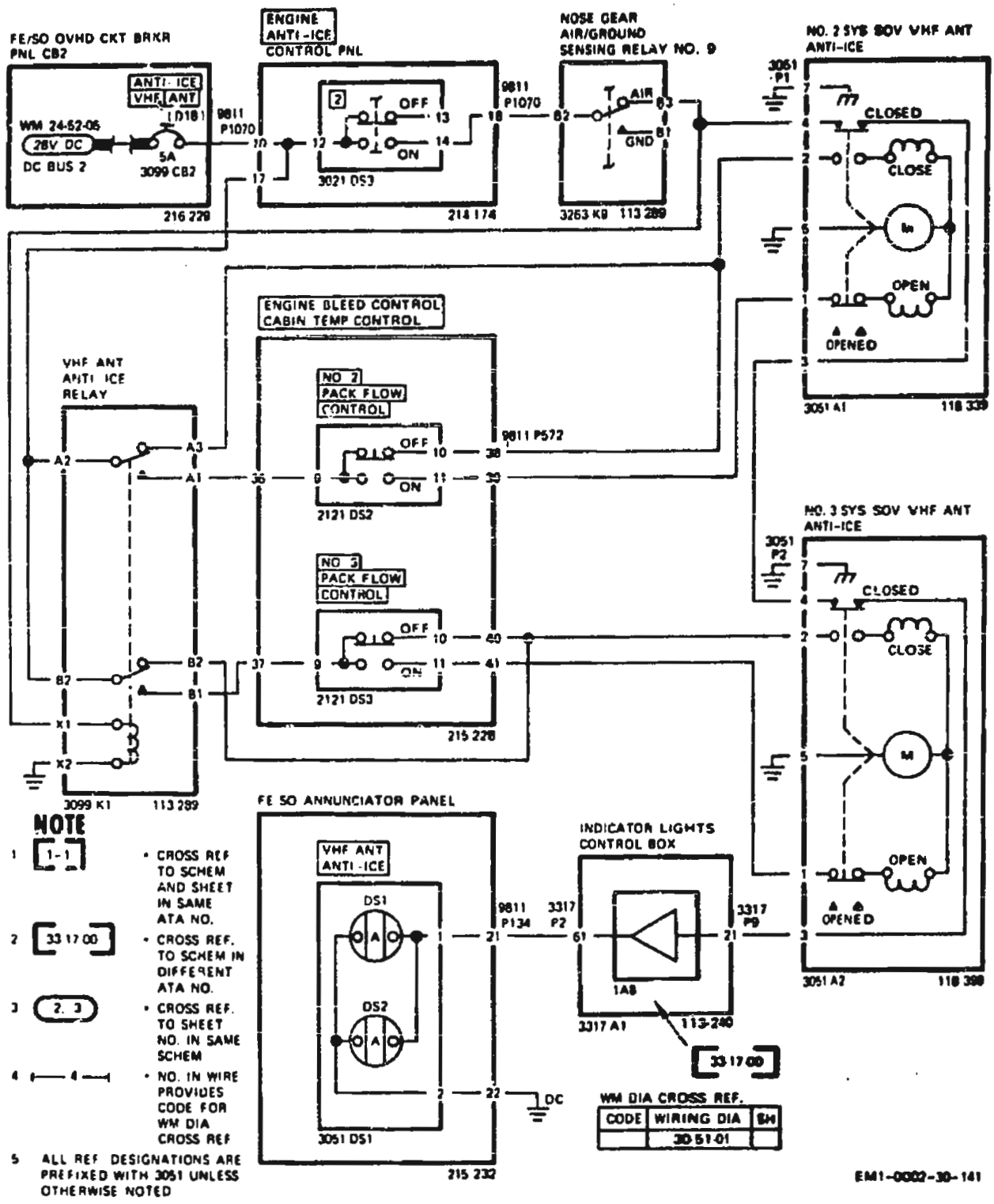
A11-0100-30-059

VHF Antenna Anti-Ice System
Figure 1



R VHF Antenna Anti-Ice System Schematic
R Figure 2

When both valves are driven to the closed position, the VHF ANT A/I OFF indicator comes on.

VHF ANTENNA ANTI-ICE SYSTEM - FAULT ISOLATION

R NOTE: On aircraft with SB30-043, and 032-999, the VHF Antenna Anti-Ice System is removed.

1. General

Reference data and fault isolation procedures for troubleshooting VHF Antenna Anti-Ice system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

Figure 101, Component Location Index, is an alphabetical listing of all components associated with the VHF Antenna Anti-Ice system. It gives the area and access of each component and its respective removal and installation reference.

Figure 102, Component Locator Diagram, illustrates the location of the aircraft of all the components listed in the Component Location Index.

Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

2. Fault Isolation/Identification

Table 101 is a list of all fault isolation data in this section of the manual.

Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	VHF Antenna Anti-Ice Annunciator Light On
SCHEM 1	VHF Antenna Anti-Ice System Schematic

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CIRCUIT BREAKERS:			
ANTI-ICE – VHF ANT 3099-CB2	1	FE/SO OVHD CKT BRKR PNL CB2/P10	*
CONTROL BOX, INDICATOR LIGHTS (ILCB):			
CARD 1A8 3317-A1	1	FESC/112AB	33-17-04
INDICATOR LIGHTS:			
VHF ANT ANTI-ICE 3061-DS1	1	FE/SO ANNUNCIATOR PNL/P11	*
SWITCHLIGHTS:			
ENGINE 2 ANTI-ICE 3021-DS3	1	PILOTS OVHD PNL/P5	30-21-99
NO. 2 PACK FLOW CONTROL	1	FE/SO UPPER PNL/P11	36-00-00
NO. 3 PACK FLOW CONTROL	1	FE/SO UPPER PNL/P11	36-00-00
RELAY, AIR/GROUND SENSING 3263-K9	1	FESC/112AB	32-53-03
VALVE, SHUTOFF 3051-A1	2	LOWER RT ECS COMPT/118CR	30-51-02

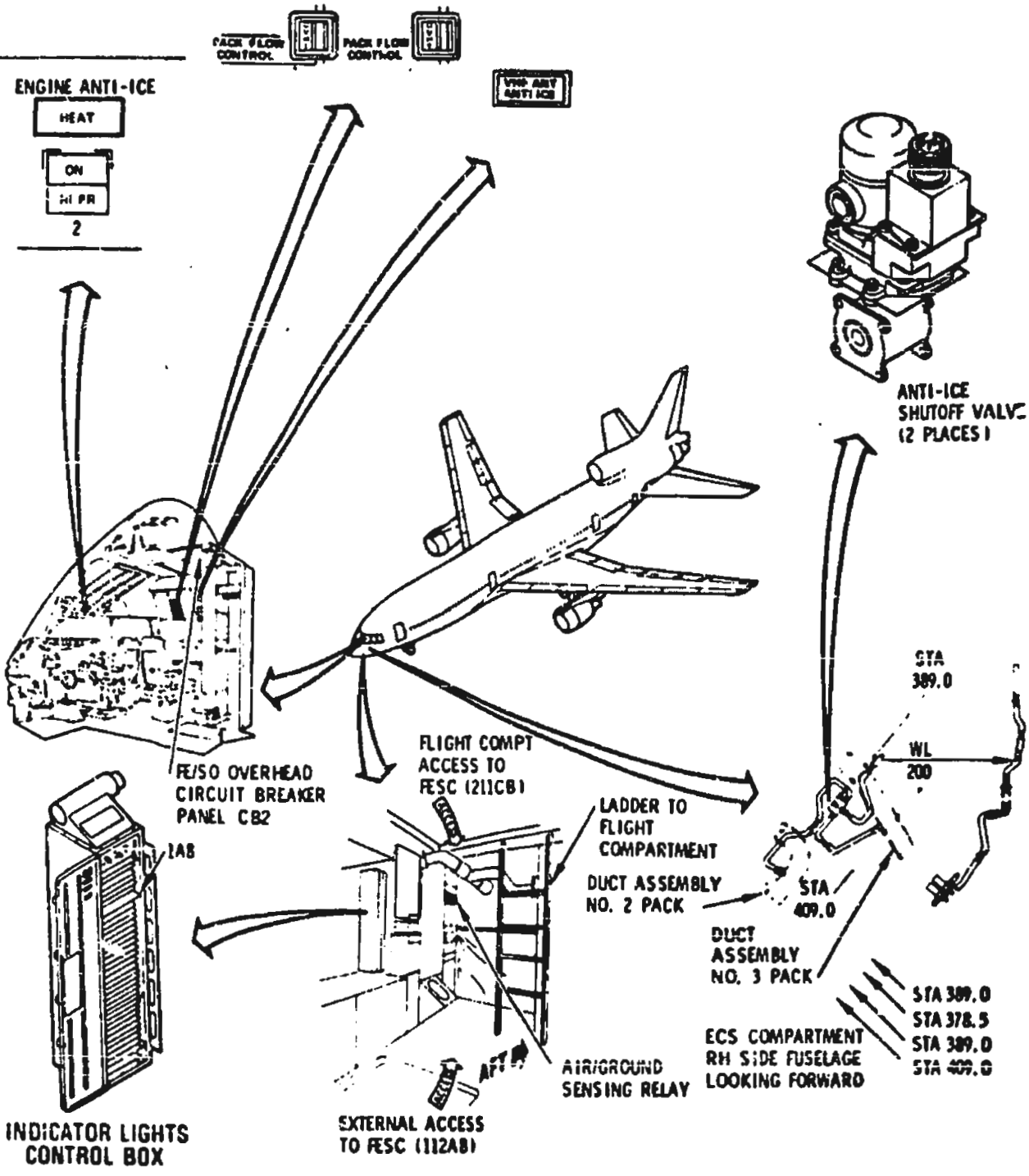
*SEE WM EQUIPMENT LIST

MI-0000-30-5084

Component Location Index
Figure 101

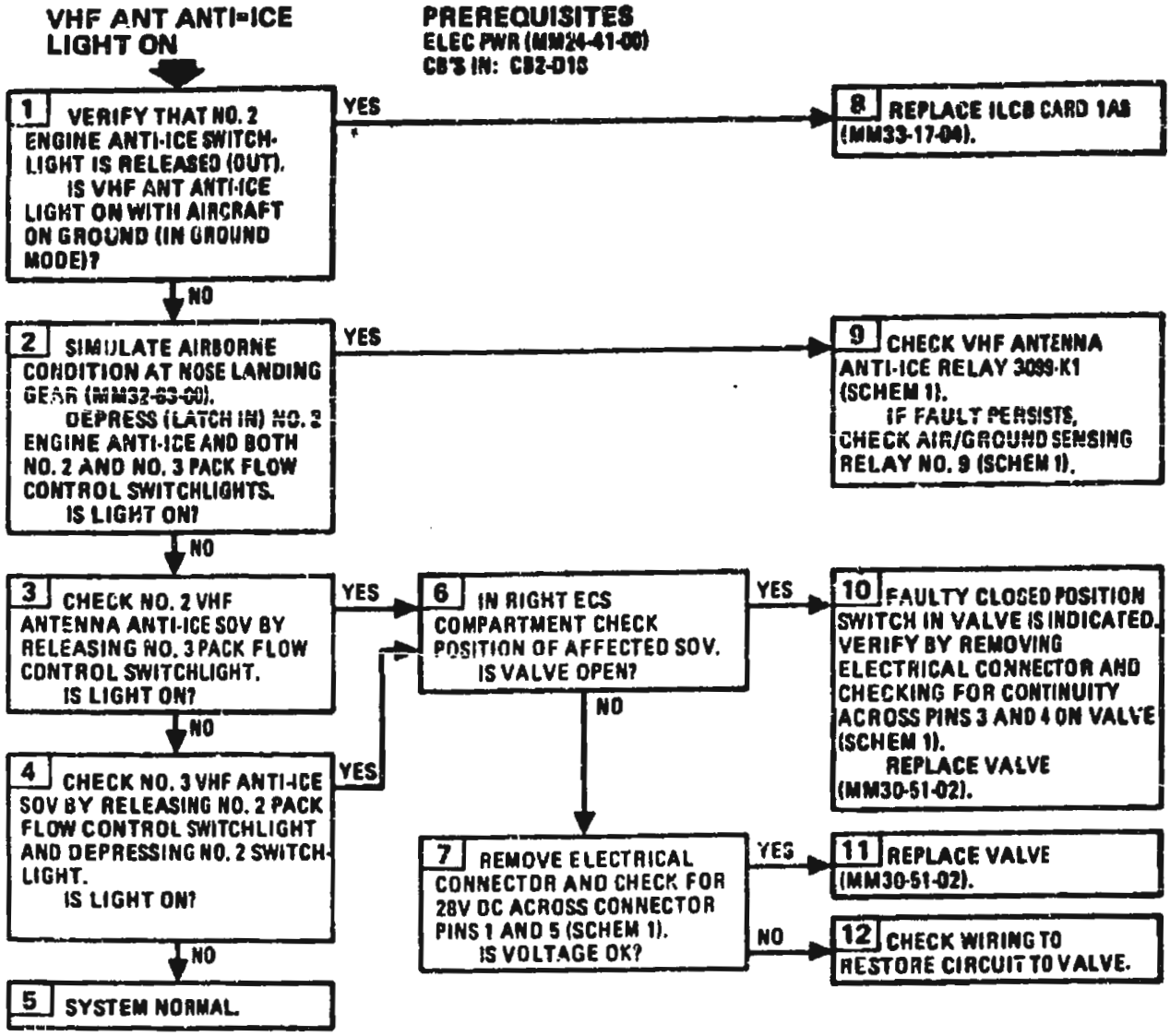
EFFECTIVITY: 001-031 WITHOUT SB30-043

0016



Component Locator Diagram
Figure 102

EFFECTIVITY: 001-031 WITHOUT SB30-045

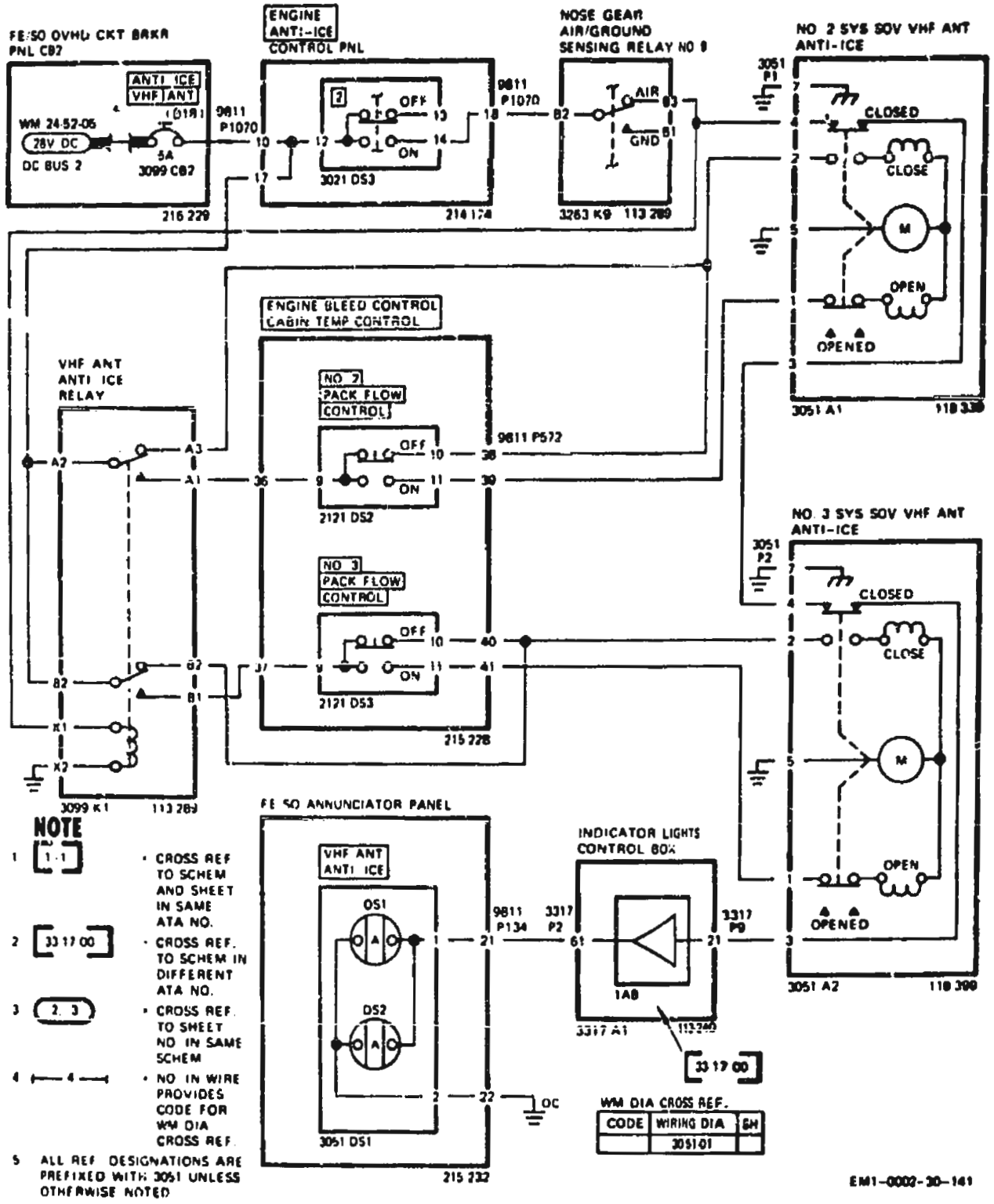

VHF ANT ANTI-ICE LIGHT ON
PREREQUISITES
ELEC PWR (MM24-41-00)
CB'S IN: C82-D18
1 VERIFY THAT NO. 2 ENGINE ANTI-ICE SWITCH-LIGHT IS RELEASED (OUT). IS VHF ANT ANTI-ICE LIGHT ON WITH AIRCRAFT ON GROUND (IN GROUND MODE)?
YES
8 REPLACE ILCB CARD 1A8 (MM33-17-04).
NO
2 SIMULATE AIRBORNE CONDITION AT NOSE LANDING GEAR (MM32-63-00). DEPRESS (LATCH IN) NO. 3 ENGINE ANTI-ICE AND BOTH NO. 2 AND NO. 3 PACK FLOW CONTROL SWITCHLIGHTS. IS LIGHT ON?
YES
9 CHECK VHF ANTENNA ANTI-ICE RELAY 3099-K1 (SCHEM 1). IF FAULT PERSISTS, CHECK AIR/GROUND SENSING RELAY NO. 9 (SCHEM 1).
NO
3 CHECK NO. 2 VHF ANTENNA ANTI-ICE SOV BY RELEASING NO. 3 PACK FLOW CONTROL SWITCHLIGHT. IS LIGHT ON?
YES
6 IN RIGHT ECS COMPARTMENT CHECK POSITION OF AFFECTED SOV. IS VALVE OPEN?
YES
10 FAULTY CLOSED POSITION SWITCH IN VALVE IS INDICATED. VERIFY BY REMOVING ELECTRICAL CONNECTOR AND CHECKING FOR CONTINUITY ACROSS PINS 3 AND 4 ON VALVE (SCHEM 1). REPLACE VALVE (MM30-51-02).
NO
4 CHECK NO. 3 VHF ANTI-ICE SOV BY RELEASING NO. 2 PACK FLOW CONTROL SWITCHLIGHT AND DEPRESSING NO. 2 SWITCH-LIGHT. IS LIGHT ON?
YES
7 REMOVE ELECTRICAL CONNECTOR AND CHECK FOR 28V DC ACROSS CONNECTOR PINS 1 AND 5 (SCHEM 1). IS VOLTAGE OK?
YES
11 REPLACE VALVE (MM30-51-02).
NO
12 CHECK WIRING TO RESTORE CIRCUIT TO VALVE.
NO
5 SYSTEM NORMAL.

M1-0003-30-5007

R R VHF Antenna Anti-Ice Annunciator Light On
Figure 103

EFFECTIVITY: OC1-031 WITHOUT SB30-043

0018



VHF Antenna Anti-Ice System Schematic
SCHEM 1

EFFECTIVITY: 001-031 WITHOUT SB30-043

001B

VHF ANTENNA ANTI-ICE SYSTEM - ADJUSTMENT AND TEST

R NOTE: On aircraft with SB30-043, and 032-999, the VHF Antenna Anti-Ice System has been removed.

1. Referenced Procedure

24-41-00	External Power/Ground Service System - Maintenance Practices
32-63-00	Air/Ground Sensing - Maintenance Practices

2. Adjustment/Test

A. Operational Test

(1) Turn on electrical power (Ref. 24-41-00).

(2) On pilots overhead circuit breaker panel CB1, zone 210, verify that circuit breaker ANN - RESET (L9) is closed.

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that circuit breakers VHF - ANT (D18), F/E IND LT TEST - 1 (H1), F/E IND LT TEST - 5 (H5), and MLG - GND - SENSE (L8) are closed.

On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, verify that circuit breaker PROXIMITY SWITCH -3 (H4) is closed.

(3) On Flight Engineer/Second Officers LIGHTS panel, depress (latch in) TEST switchlight. Verify that VHF ANT ANTI-ICE annunciator light comes on.

(4) Depress (release) TEST switchlight. Annunciator light goes off.

(5) Simulate airborne condition at nose landing gear (Ref. 32-63-00).

(6) With ENGINE ANTI-ICE 2 switchlight on pilots overhead panel and NO. 2 and NO. 3 PACK FLOW CONTROL switchlights on Flight Engineer/Second Officers ENGINE BLEED CONTROL panel in off (released) position, verify that annunciator light is off.

(7) Depress (latch in) ENGINE ANTI-ICE 2 switchlight. Verify that ON light and annunciator light are on.

(8) Depress (latch in) NO. 2 PACK FLOW CONTROL switchlight. Verify that annunciator light is off.

(9) Depress (release) NO. 2 PACK FLOW CONTROL switchlight. Verify that annunciator light is on.

(10) Depress (latch in) NO. 3 PACK FLOW CONTROL switchlight. Verify that annunciator light is off.

(11) Depress (release) NO. 3 PACK FLOW CONTROL switchlight. Verify that annunciator light is on.

(12) Remove aluminum shim from between target and sensor at nose landing gear. Verify that annunciator light is off.

(13) Depress (release) ENGINE ANTI-ICE 2 switchlight. Verify that ON light is off.

ANTI-ICE SHUTOFF VALVE - MAINTENANCE PRACTICES

1. General

R NOTE: On aircraft with SB30-043, and 032-999, the VHF Antenna Anti-Ice System removed.

The VHF antenna anti-ice system uses hot air from the No. 2 or No. 3 air cycle pack systems to prevent ice formation on the VHF antennas.

2. Maintenance Practices

A. Deactivation of One Valve

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - VHF ANT (D18).

(2) At forward electrical service center, zone 113, proceed as follows:

(a) For No. 2 system shutoff valve, tag and disconnect wires 3051-20001B20 and 3051-20002B20 from terminal modules 9811-TB881-12C and 9811-TB881-13B respectively.

(b) For No. 3 system shutoff valve, tag and disconnect wires 3051-30001B20 and 3051-30002B20 from terminal modules 9811-TB881-14C and 9811-TB881-15B respectively.

(3) Tape and stow disconnected wires.

(4) Remove tag and close circuit breaker opened in Step 2A(1).

(5) On pilots overhead control panel, zone 210, placard ENG 2 ANTI-ICE switchlight VHF ANTENNA (No. 2 or No. 3) ANTI-ICE VALVE INOPERATIVE.

(6) Make appropriate entry in aircraft log book.

B. Deactivation of Both Valves

(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and collar circuit breaker ANTI-ICE - VHF ANT (D18).

(2) On pilots overhead control panel, zone 210, placard ENG 2 ANTI-ICE switchlight VHF ANTENNA ANTI-ICE SYSTEM INOPERATIVE.

(3) Make appropriate entry in aircraft log book.

ANTI-ICE SHUTOFF VALVE - REMOVAL AND INSTALLATION

1. General

NOTE: On aircraft with SB30-043, the VHF Antenna Anti-Ice System removed.

The anti-ice shutoff valves are located in the lower outboard area of the right environmental control system (ECS) compartment, zone 118. Access is through ECS compartment door 118CR.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-3-390, Temp A, Inconel, 0.020-inch diameter, or equivalent

Seals (Ref. Fig. 401)

3. Referenced Procedure

30-51-00 VHF Antenna Anti-ice System - Adjustment and Test

4. Removal/Installation

A. Removal

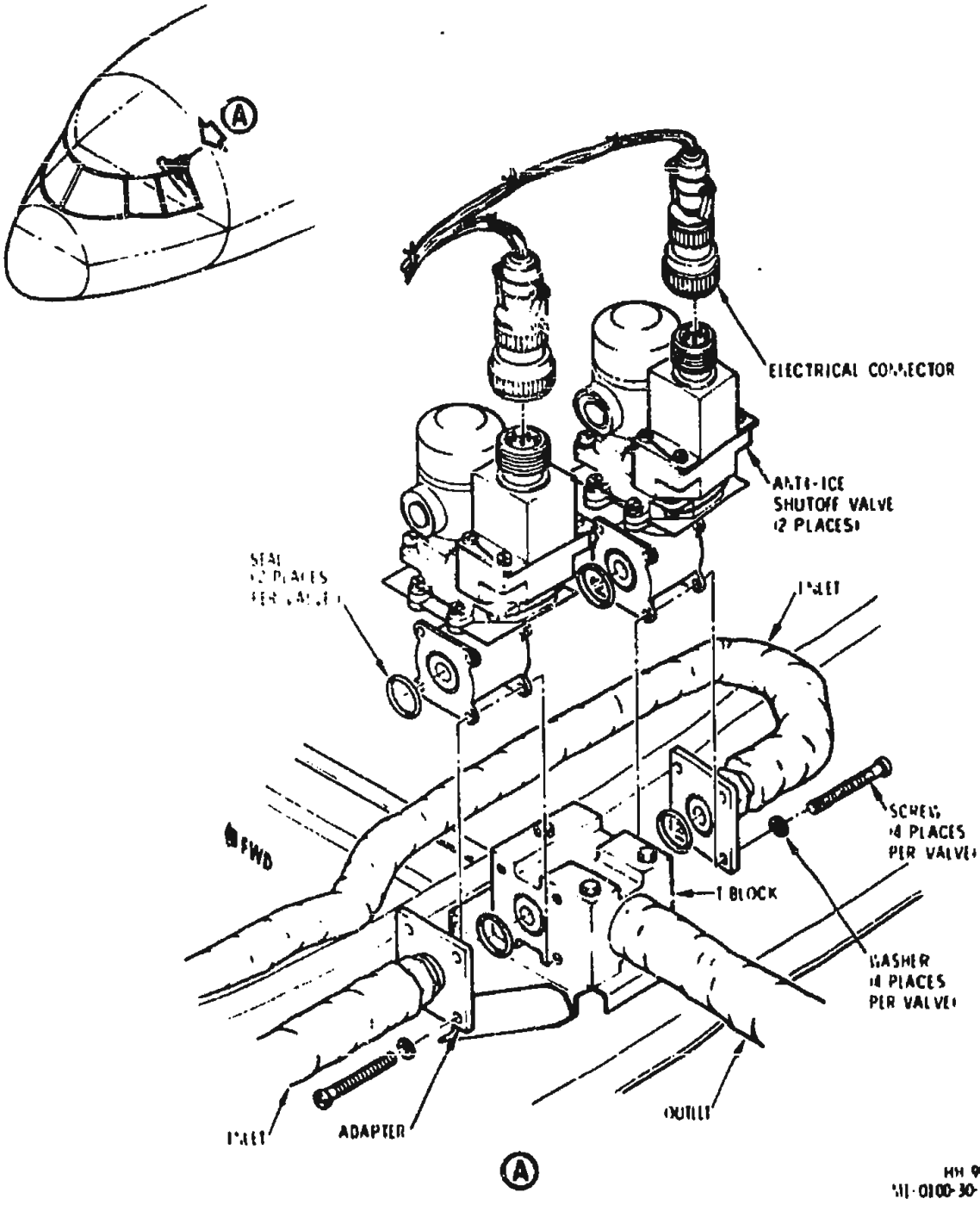
(1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker ANTI-ICE - VHF ANT.

R WARNING: TAG FLIGHT ENGINEER/SECOND OFFICERS BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS TO PREVENT SYSTEM OPERATION UNTIL COMPLETION OF PROCEDURES.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(2) Open ECS compartment door and locate anti-ice shutoff valves in compartment (Ref. Fig. 401).

(3) Remove valve electrical connector.



Anti-ice Shutoff Valve - Removal and Installation
Figure 401

(4) Remove bolts attaching adapter and shutoff valve to T-block; remove valve and seals.

B. Installation

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

(2) Install new seals and place shutoff valve in mounting position.

(3) Bolt adapter and shutoff valve to T-block; lock-wire bolts.

(4) Connect electrical connector to shutoff valve and lock-wire.

(5) Close and secure ECS compartment door.

(6) Remove tag and close circuit breaker opened in Step 4A(1).

(7) Test VHF antenna anti-ice system (Ref. 30-51-00).

WATER SUPPLY/DRAIN LINE HEATERS - DESCRIPTION AND OPERATION

1. General

CR NOTE: Waste System drain nipple heater have been deactivated on
CR aircraft 001-031, until reactivated by incorporation of
CR SB30-050, aircraft 032-999 have new type drain nipple
C heater (Ref. 30-71-18,401).

C NOTE: Waterline heater systems A, B and F are not installed on
C aircraft 032-999. Cargo compartment drain heaters are
C deactivated. Additionally, cargo compartment drains are
C heated on aircraft modified by SB30-034.

C Electrical heaters are provided to protect the waste system and
C the water supply and drain lines from freezing.

Bleed air heating is provided for the aft underfloor waste compartment.

Aircraft parked for a prolonged period in subfreezing weather with no power applied should have potable water and waste water system drained to prevent possible damage by ice formation (Ref. 38-11-00 and 12-15-11, respectively).

2. Waterline Heater System

A. Description

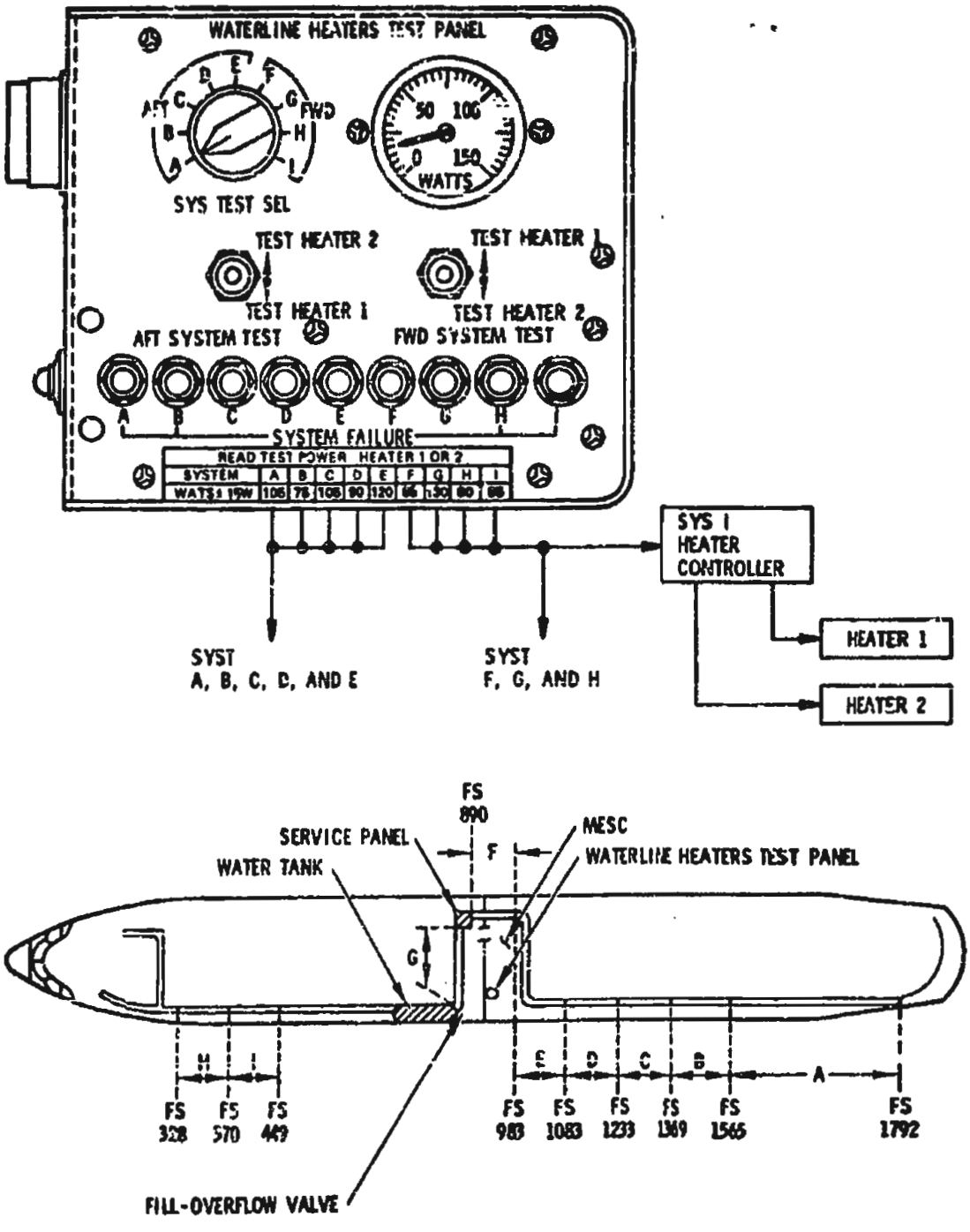
The waterline heaters are divided into forward and aft systems (Ref. Fig. 1). Aft systems A, B, and C are aft of the MESC aft bulkhead at FS983; forward systems F, G, H, and I are forward of FS 983.

NOTE: Aircraft without center section fuel also incorporate aft systems D and E.

All forward systems share a common power source as do all aft systems.

The individual systems may incorporate up to six heater blankets, each with primary and secondary heating elements. Each system has a controller mounted directly on the waterline which monitors waterline temperature and controls heater operation.

B. Operation (Ref. Fig. 2)



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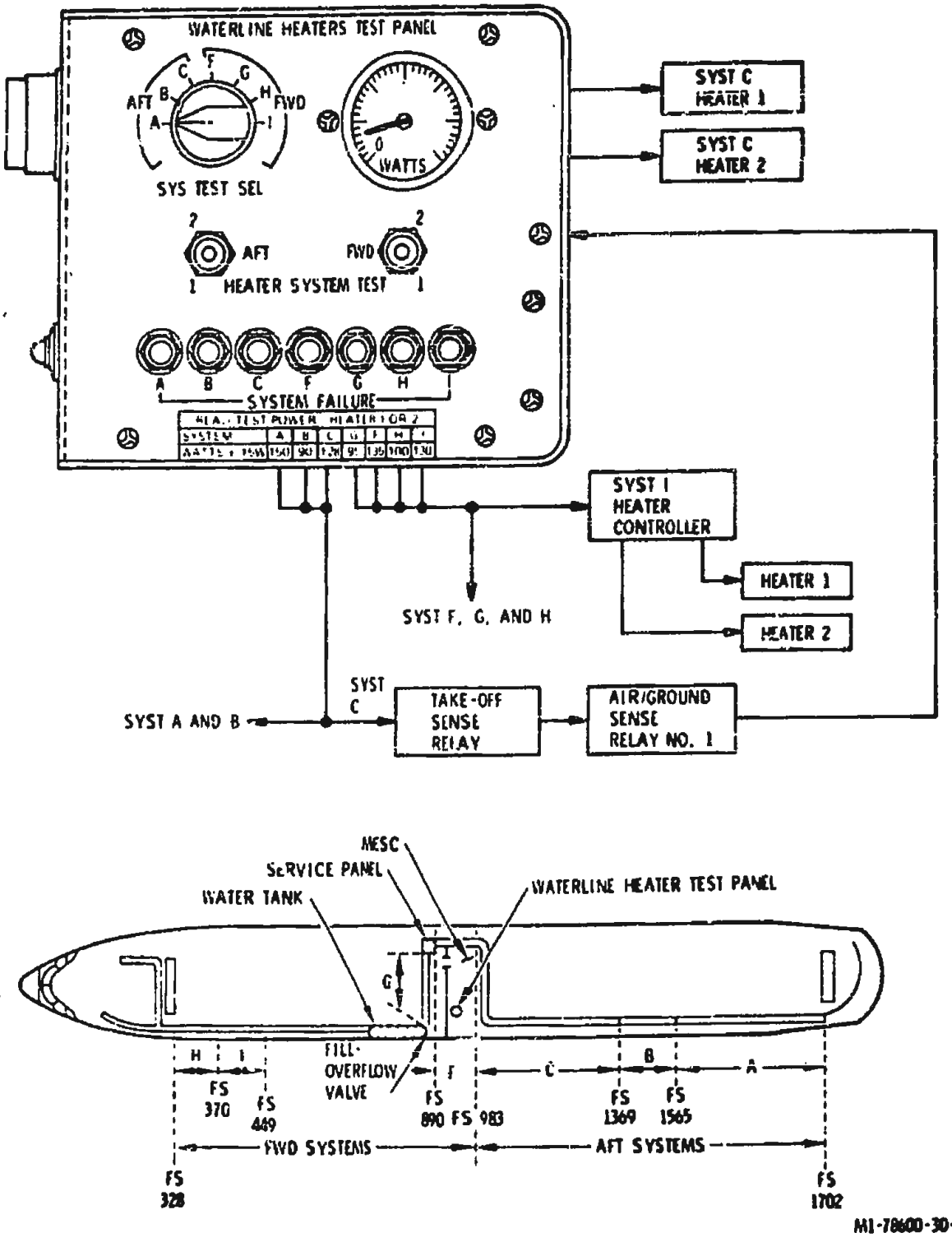
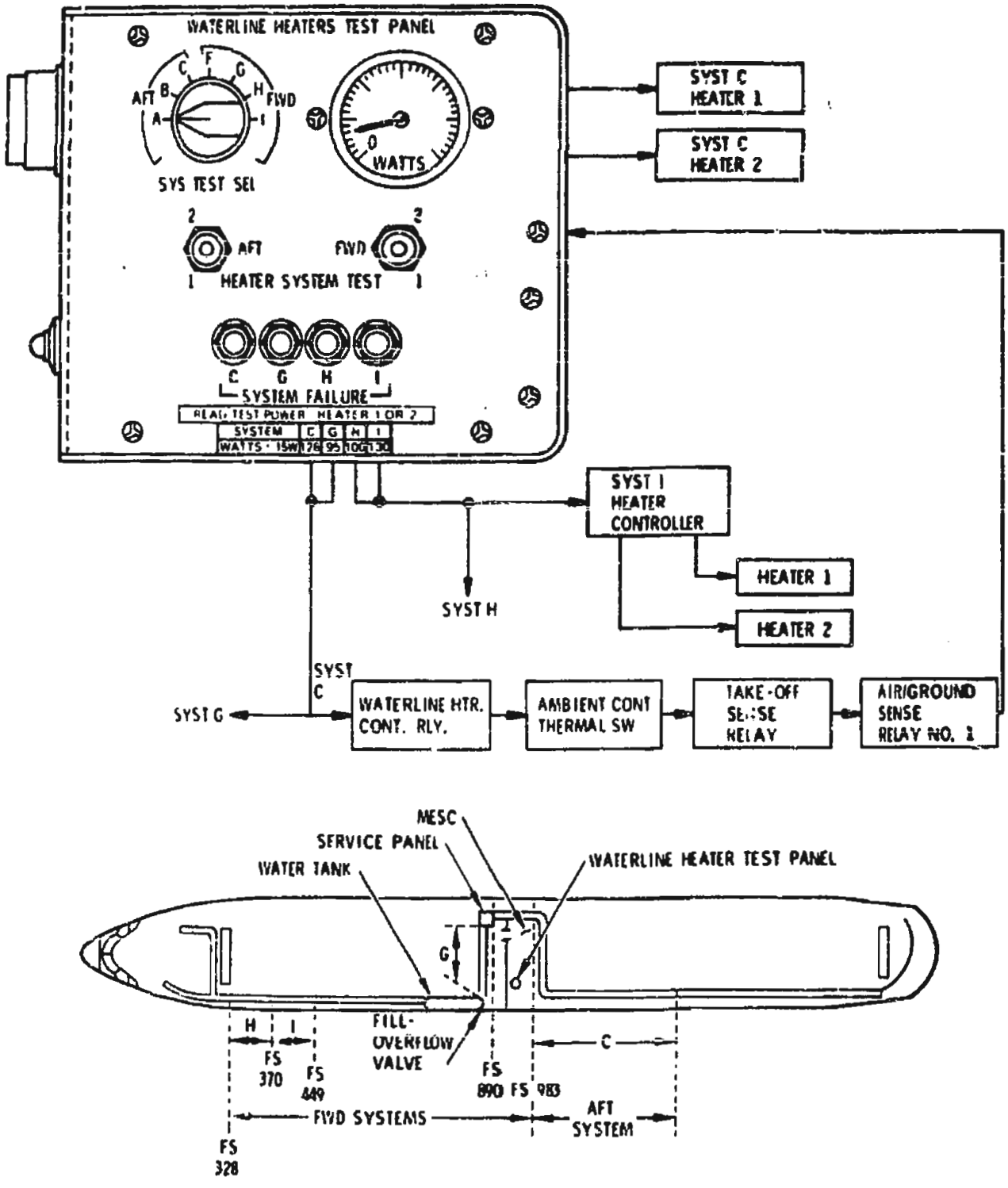
R Waterline Heater and Test Panel
R Figure 1



Waterline Heater and Test Panel
Figure 1



M1-000 30-293

R Waterline Heater and Test Panel
R Figure 1

Heater operation is automatic when the applicable circuit breakers are closed and aircraft power is on. The primary heater thermal switch in the controller closes at a monitored temperature of approximately 46 degrees F or 8 degrees C. This switch then remains closed until the monitored waterline temperature has risen to approximately 65 degrees F or 18 degrees C. When this switch is closed, power is applied to the primary heater element of each heater blanket within the system.

The secondary heater thermal switch in the controller closes at a monitored temperature of approximately 38 degrees F or 4 degrees C. This switch then remains closed until the monitored waterline temperature has risen to approximately 65 degrees F or 18 degrees C. When this switch is closed, power is applied to the secondary heater element of each heater blanket within the system.

On aircraft with center section fuel, system C control circuits include two additional relays, air/ground sense No. 1 and takeoff sensing which enable heater operation only when the aircraft is on the ground and is not in takeoff mode.

In flight, system C waterlines are protected from freezing by MESC air ducted through a metal shroud surrounding the line. System C controller is also different from other controllers in that it does not incorporate an EMI filter. Instead, the thermal switches operate heater control relays in the test panel; this prevents electrical arcing at the switches and eliminates the requirement for an EMI filter.

On aircraft 032-999, waterline heater systems C, G, H, and I control circuits include two additional relays, air/ground sense No. 1 and takeoff sensing, which enable heater operation only when the aircraft is on the ground and is not in takeoff mode. An ambient control thermal switch, containing four identical switches, senses ambient temperature in the Keelson area. These switches control power to the heater control switches in systems C, G, H and I, closing at 35°F and opening at 45°F. The four switches comprising the ambient control thermal switch are wired in series - parallel to assure that switch failures will minimize the possibility of losing control power.

3. Waterline Heaters Test Panel

A. Description and Operation

A WATERLINE HEATERS TEST PANEL is provided in the MESC. It senses the activation of any secondary heater and turns on the WATERLINE HTR light on the FE/SO annunciator panel. Simultaneously, a magnetic SYSTEM FAILURE indicator on the test panel turns yellow to identify the system. The test panel also contains a wattmeter and test switches which enable each primary and secondary heater to be tested separately.

4. Waste System Heaters

A. Description and Operation

Electric heaters are provided for the waste system components including the drain masts (Ref. Fig. 3 and 4). The heaters are thermostatically controlled dual heater assemblies.

Either drain mast heater circuit can be manually selected at the WASTE WATER panel in the Flight Engineer/Second Officers panel, zone 215. One heater circuit is always selected. The panel also provides visual indication of a failed heater circuit (Ref. Fig. 3).

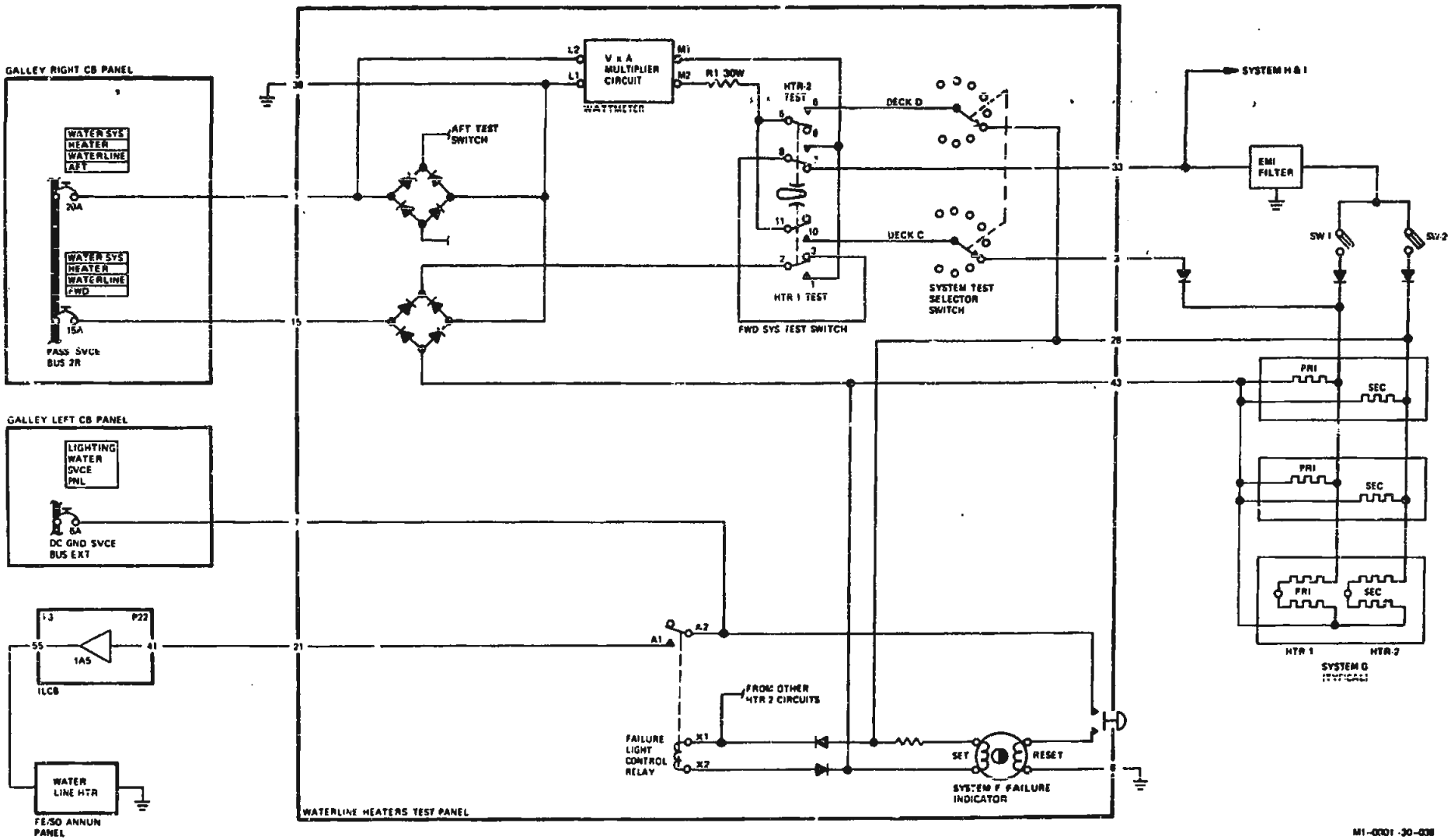
The aft waste compartment (aft lavatory underfloor), zone 167, is prevented from freezing by bleed air taken from engine No. 2 aft of the aft fuselage duct isolation valve (Ref. 36-14-00). A motor-operated ball shutoff valve (heat control valve), a relay, and a temperature switch maintain an average temperature of 60 degrees F (Ref. Fig. 5 and 6).

The aft lavatory lower exhaust duct in the aft waste compartment is also protected from freezing by electric heater blankets (Ref. 21-26-00).

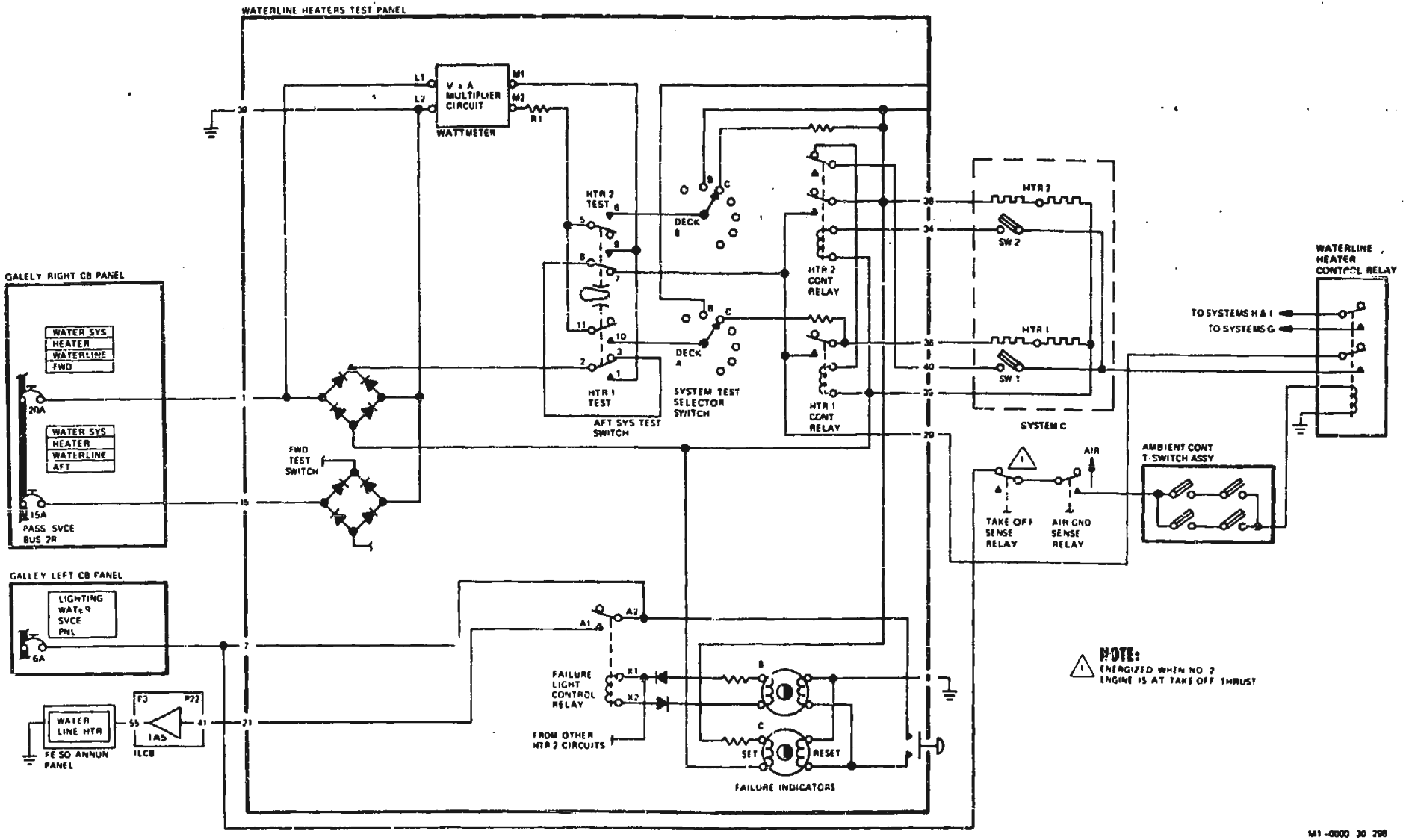
5. Cargo Compartment Drain Heaters

A. Description

The cargo compartment drain heaters are continuous type single heater units (Ref. Fig. 4).



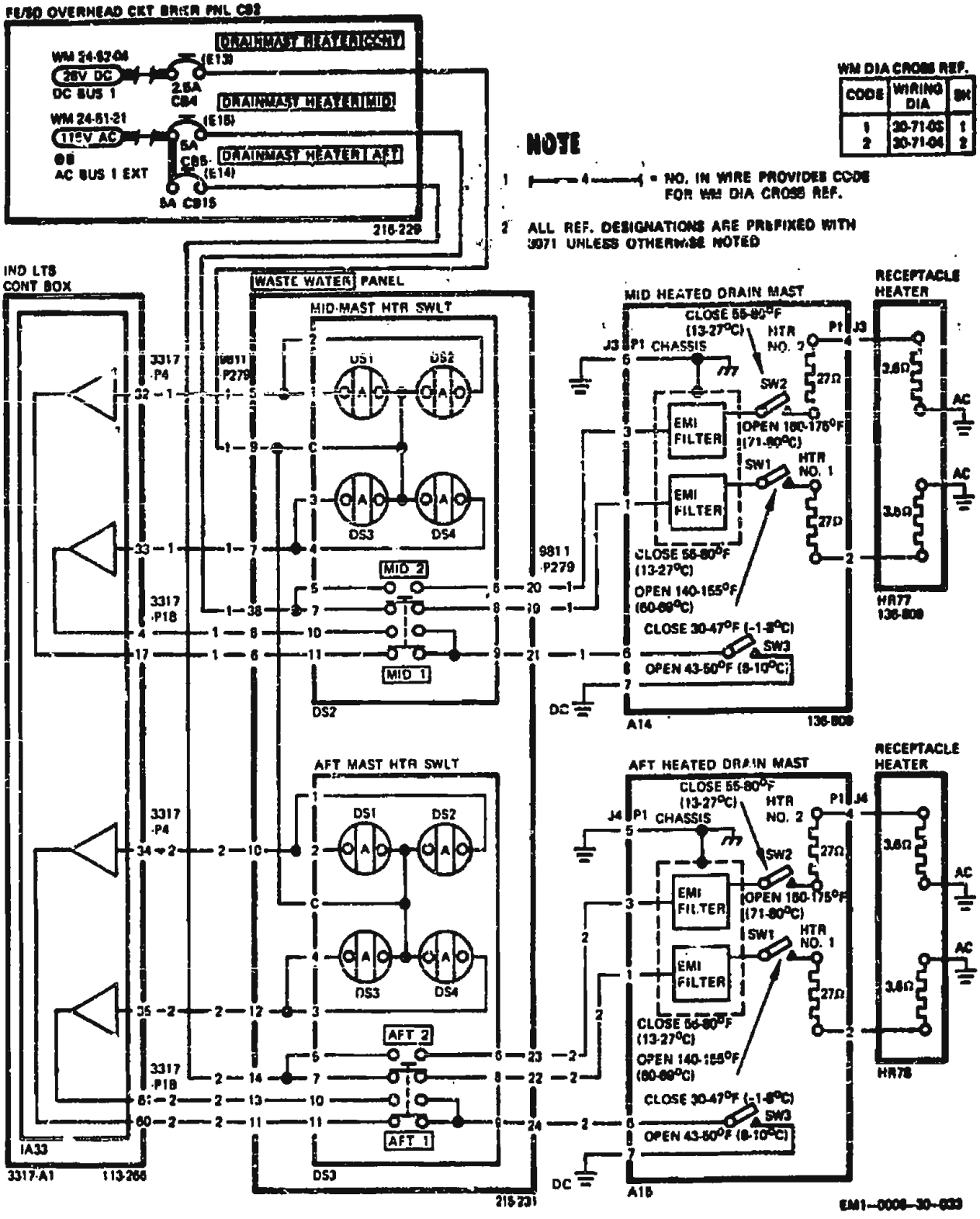
R Waterline Heaters Simplified Schematic
R Figure 2



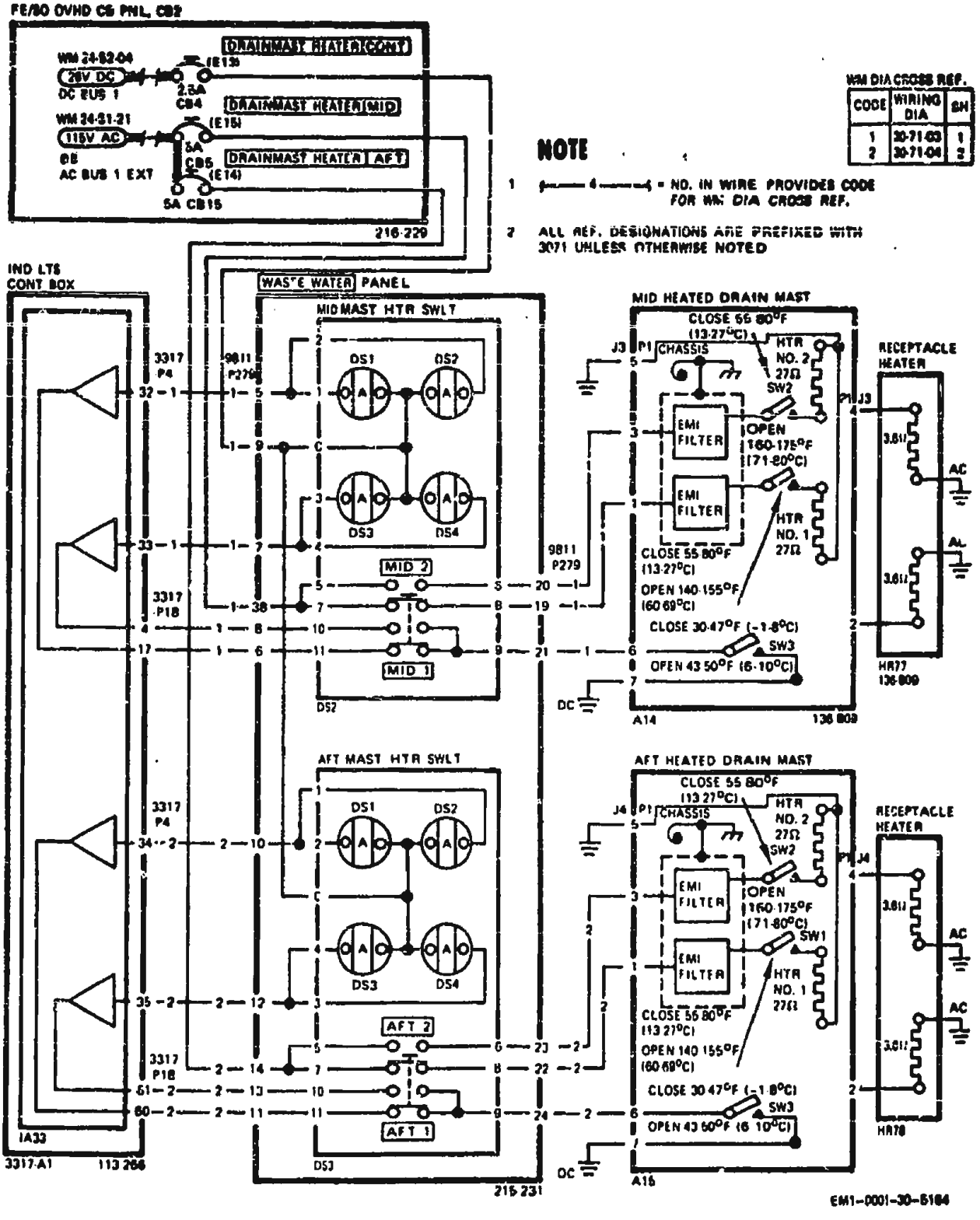
Waterline Heaters Simplified Schematic
Figure 2

EFFECTIVITY: 032-999

0018



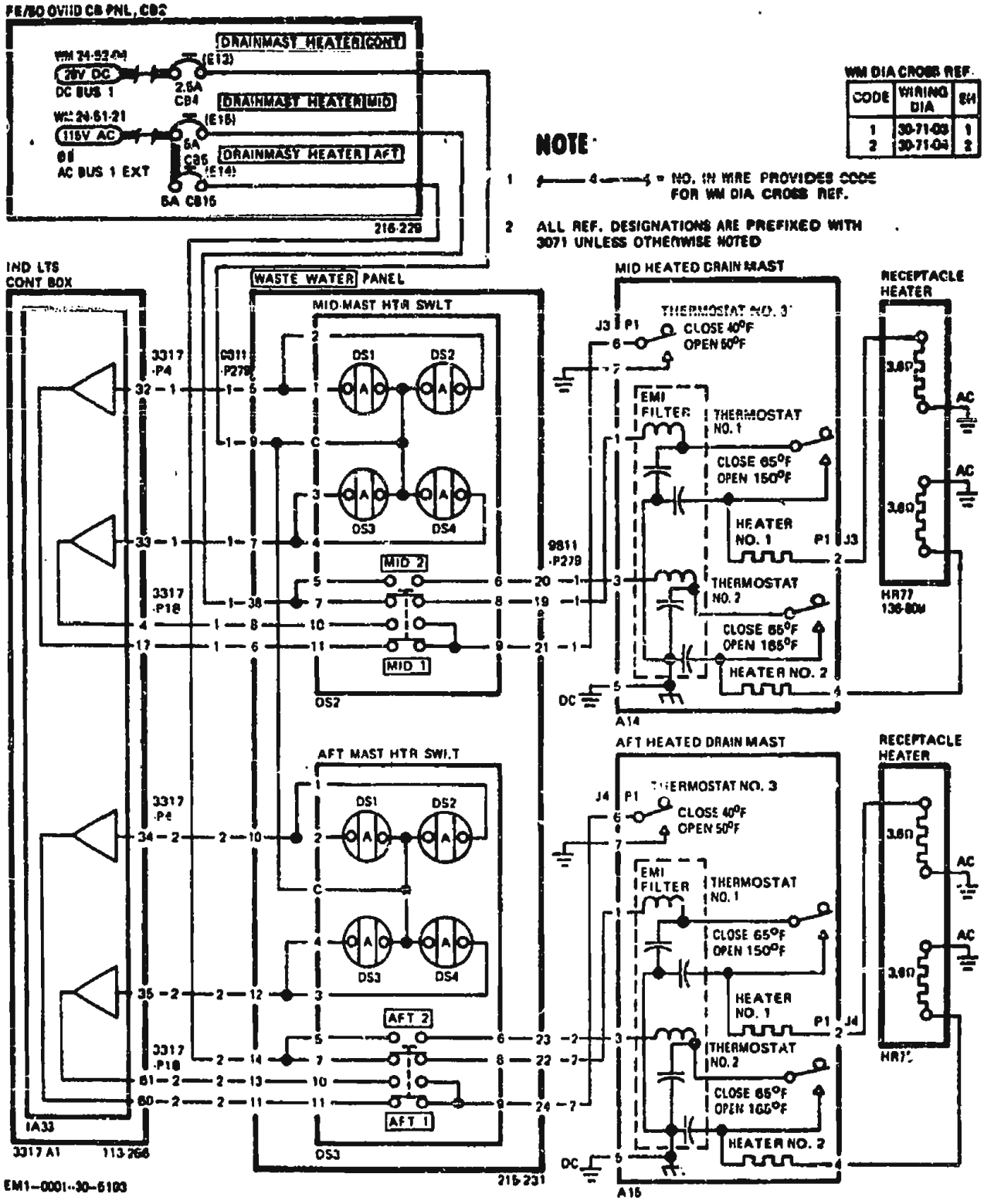
Drain Mast Heaters Schematic
Figure 3



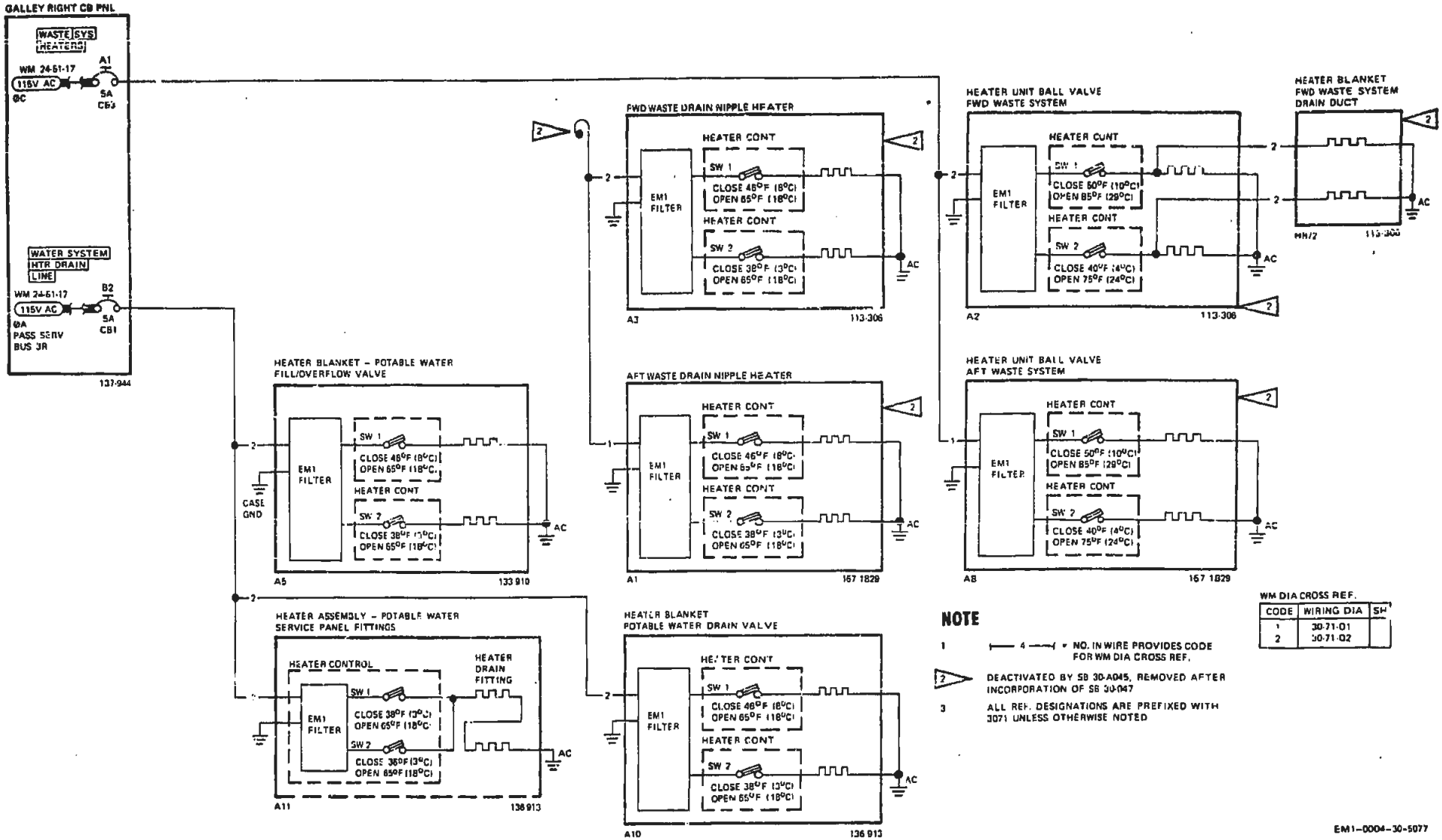
R Drain Mast Heaters Schematic
R Figure 3

EFFECTIVITY: 001-031 WITH SB30-048 R1

001B

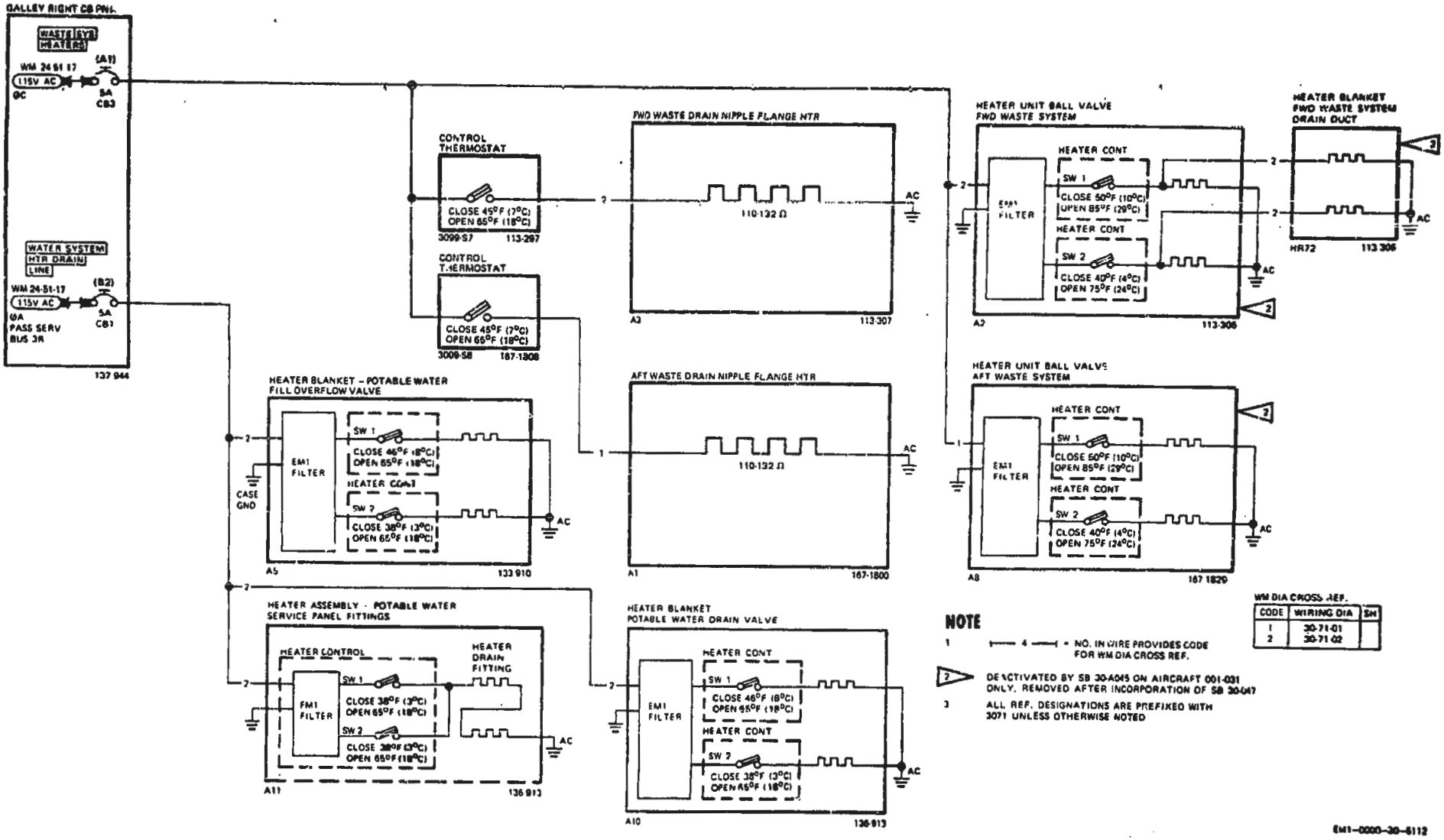


R R Drain Mast Heater Schematic
Figure 3



C C Waste System/Cargo Compartment Drains Schematic
Figure 4

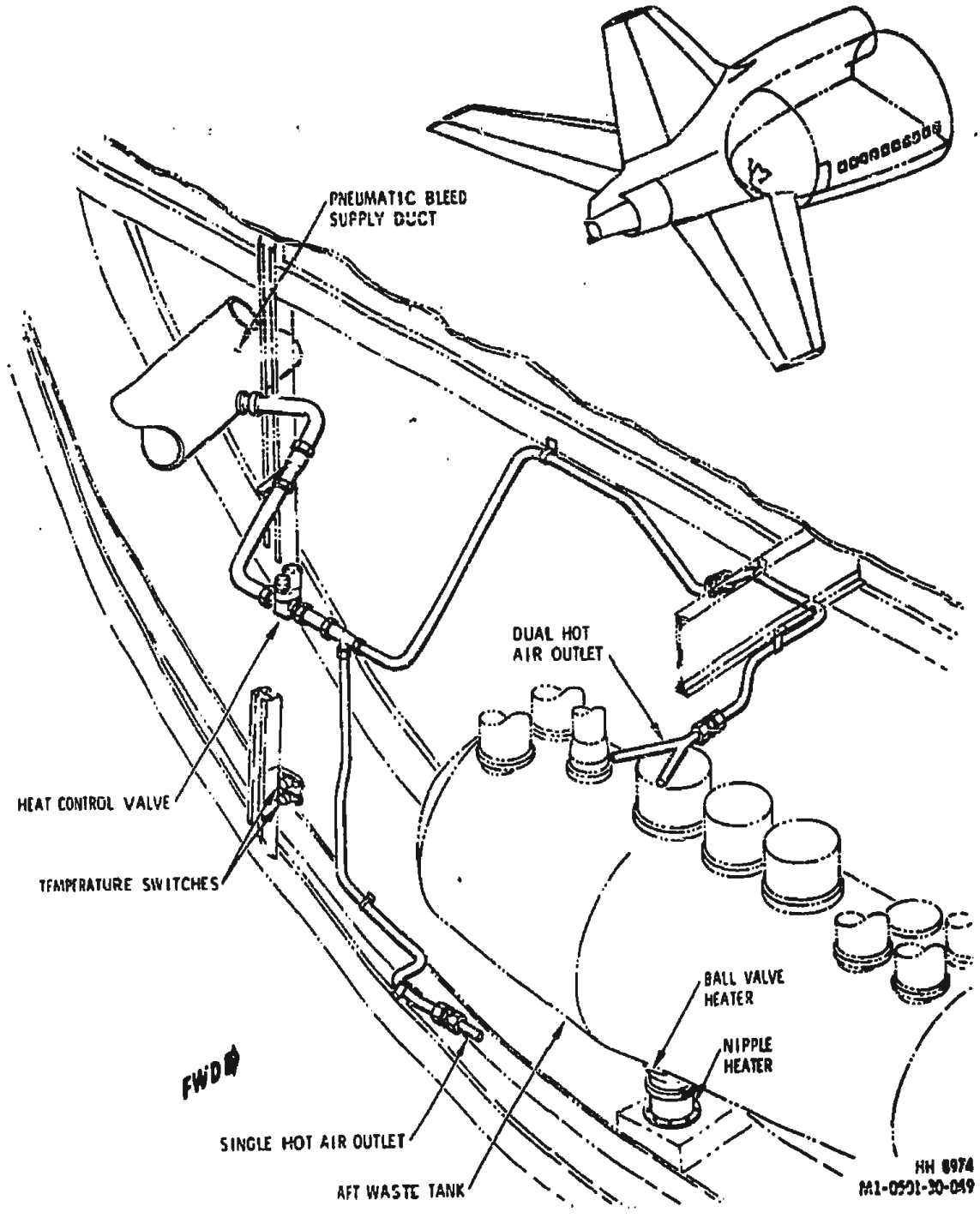
R R 0019 EFFECTIVITY: 001-031 WITHOUT SB30-050



Waste System/Cargo Compartment Drains Schematic
Figure 4

R
R
001B

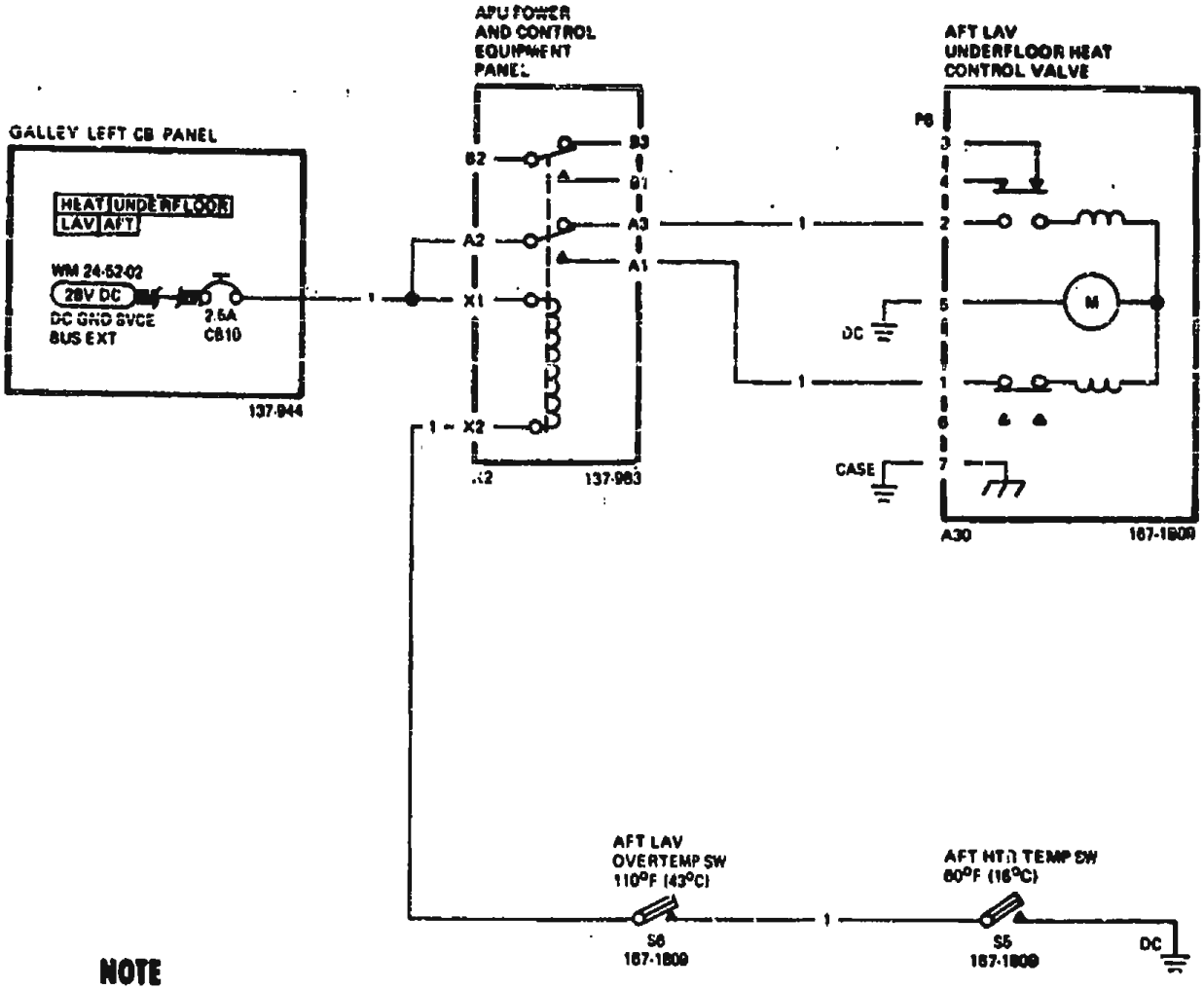
EFFECTIVITY: 001-031 WITH SB30-050 AND 032-999



R Aft Waste Compartment Heat
R Figure 5

EFFECTIVITY: ALL

001B



NOTE

1 ⟵4⟶ • NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF

2 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3071 UNLESS OTHERWISE NOTED

WM DIA CROSS REF.

CODE	WIRING DIA	SH
1	30-71-10	1

M1-0000-30-084

R Aft Waste Compartment Heat Schematic
R Figure 6

R WATER SUPPLY/DRAIN LINE HEATERS - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for troubleshooting Water Supply/Drain Line Heater system faults are included in this section of the manual. A system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel with a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

R PREREQUISITES listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnection wiring.

R Figure 101, Component Location Index, is an alphabetical listing of all components associated with the Water Supply/Drain Line Heater system. It gives the area and access of each component and its respective removal and installation reference.

R Figure 102, Component Locator Diagram, illustrates the location on the aircraft of all the components listed in the Component Location Index.

R Refer to the Maintenance Manual Introduction for a more detailed description of the Fault Isolation Reporting Method (FIRM) and use of fault isolation diagrams/schematics.

R 2. Fault Isolation/Identification

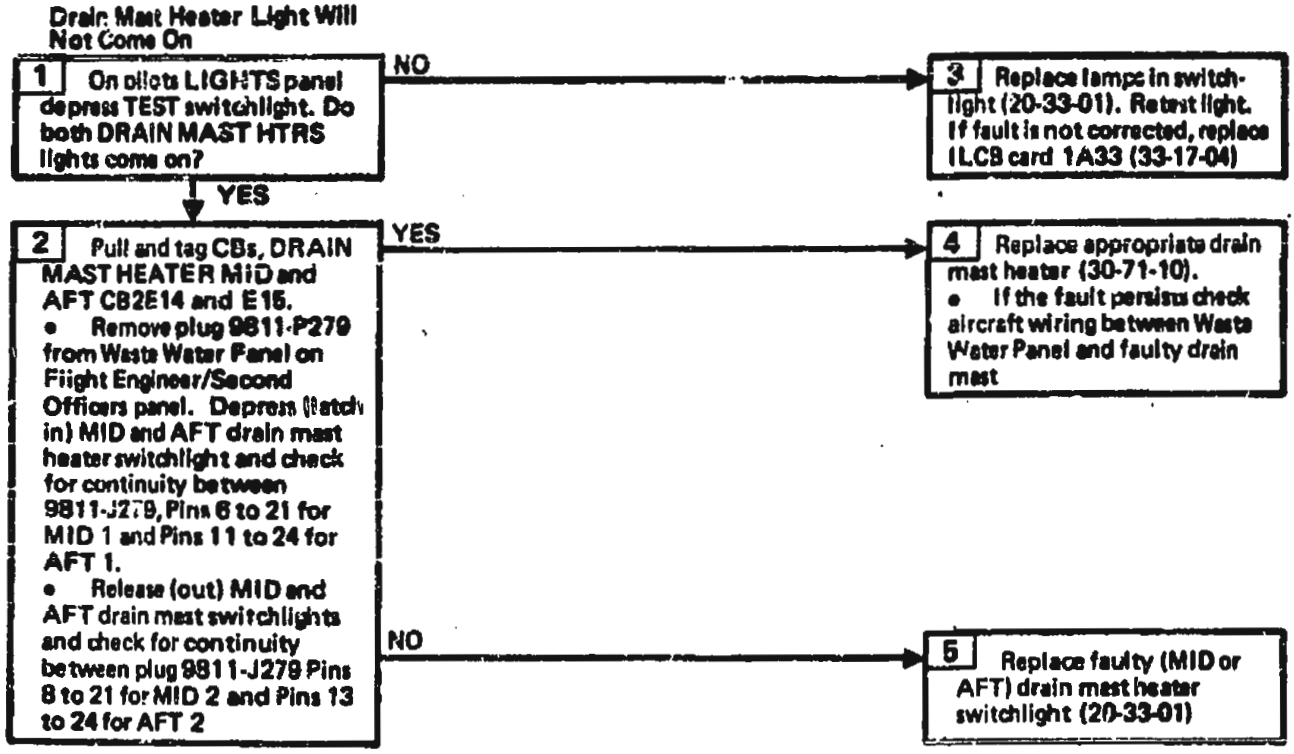
R Table 101 is a list of all fault isolation data in this section of the manual.

Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Drain Mast Heater Light Will Not Come On
104	Drain Mast Heater Light On
105	Waterline Heater Problem
SCHEM 1	Drain Mast Heater Schematic
SCHEM 2	Aft Lavatory Underfloor Heat Schematic
SCHEM 3	Water/Waste and Cargo Compartment Drains Schematic
SCHEM 4	Waterline Heaters Schematic

TO BE SUBMITTED

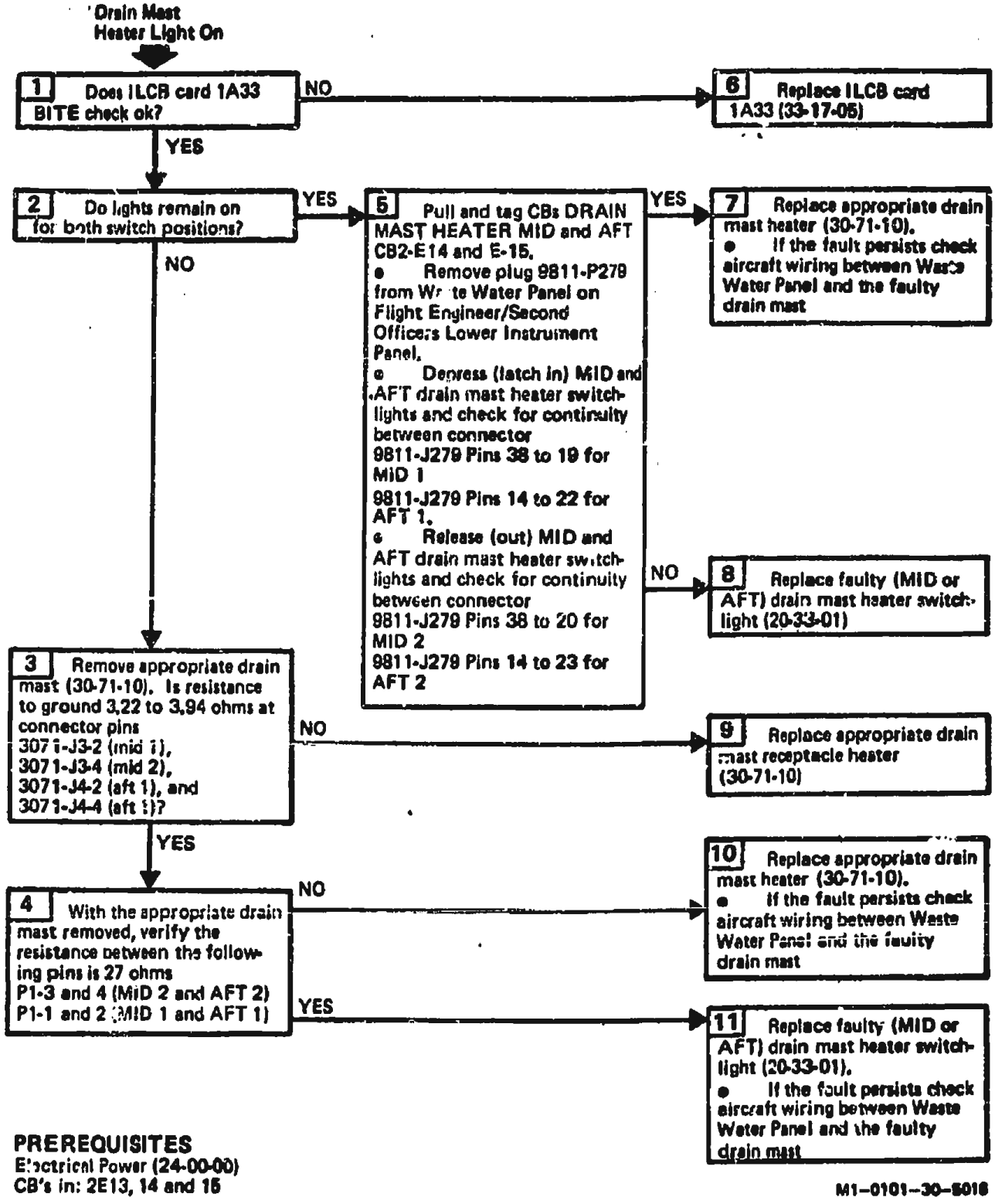
TO BE SUBMITTED


Drain Mast Heater Light Will Not Come On
1 On pilots LIGHTS panel depress TEST switchlight. Do both DRAIN MAST HTRS lights come on?
NO
3 Replace lamps in switchlight (20-33-01). Retest light. If fault is not corrected, replace ILCB card 1A33 (33-17-04)
YES
2 Pull and tag CBs, DRAIN MAST HEATER MID and AFT CB2E14 and E15.
• Remove plug 9811-P279 from Waste Water Panel on Flight Engineer/Second Officers panel. Depress (latch in) MID and AFT drain mast heater switchlight and check for continuity between 9811-J279, Pins 6 to 21 for MID 1 and Pins 11 to 24 for AFT 1.
• Release (out) MID and AFT drain mast switchlights and check for continuity between plug 9811-J279 Pins 8 to 21 for MID 2 and Pins 13 to 24 for AFT 2
YES
4 Replace appropriate drain mast heater (30-71-10).
• If the fault persists check aircraft wiring between Waste Water Panel and faulty drain mast
NO
5 Replace faulty (MID or AFT) drain mast heater switchlight (20-33-01)

PREREQUISITES
Elec Pwr (24-00-00)
CBs in: 2E13, 14 and 15

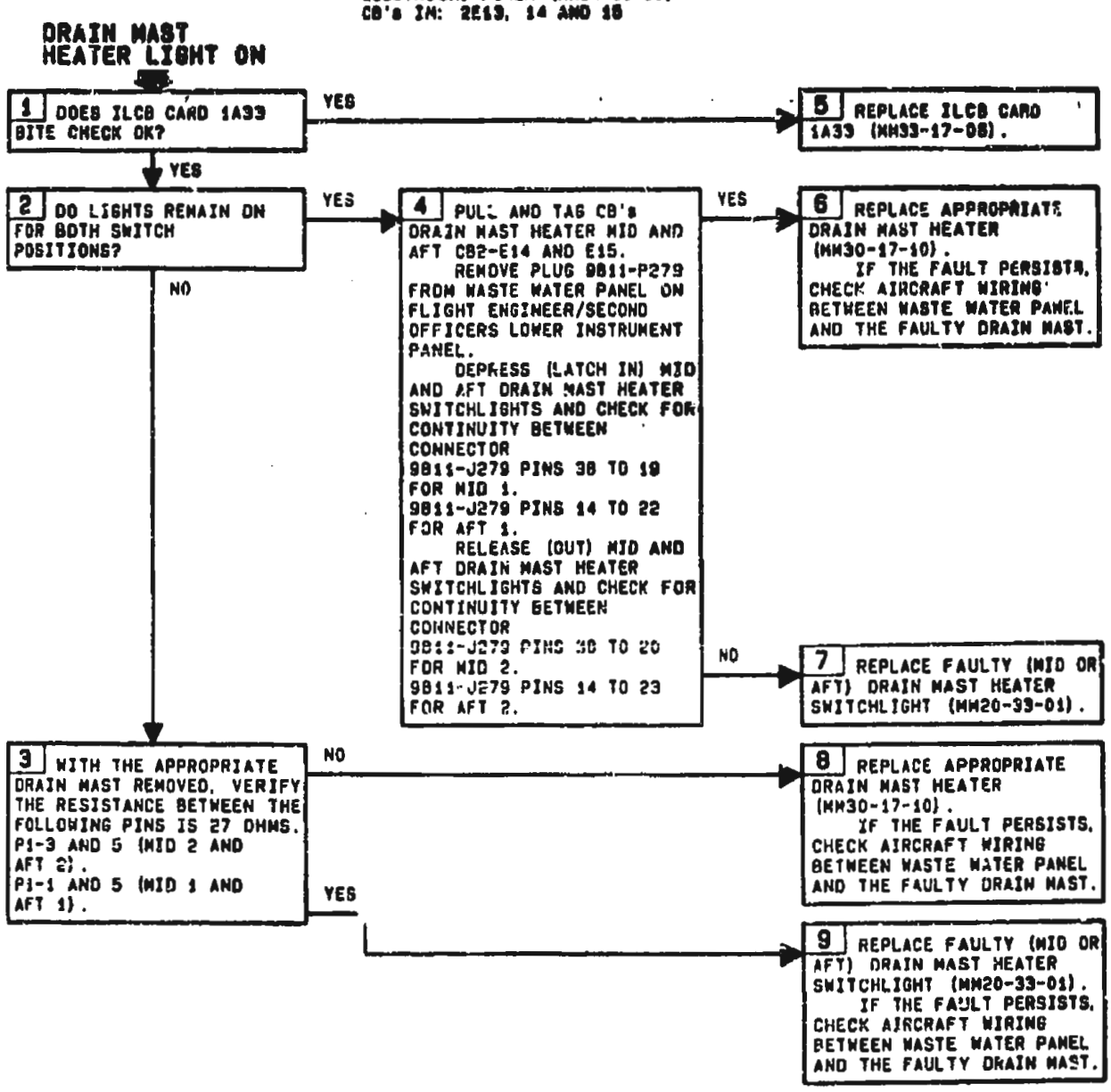
M1-0101-30-5013

R Waste Water Drain Mast Heater Light Will Not Come On
R Figure 103


Drain Mast Heater Light On
1 Does ILCB card 1A33 BITE check ok?
NO
6 Replace ILCB card 1A33 (33-17-05)
YES
2 Do lights remain on for both switch positions?
YES
5 Pull and tag CBs DRAIN MAST HEATER MID and AFT CB2-E14 and E-15.
• Remove plug 9811-P279 from Waste Water Panel on Flight Engineer/Second Officers Lower Instrument Panel.
• Depress (latch in) MID and AFT drain mast heater switch-lights and check for continuity between connector
9811-J279 Pins 38 to 19 for MID 1
9811-J279 Pins 14 to 22 for AFT 1.
• Release (out) MID and AFT drain mast heater switch-lights and check for continuity between connector
9811-J279 Pins 38 to 20 for MID 2
9811-J279 Pins 14 to 23 for AFT 2
YES
7 Replace appropriate drain mast heater (30-71-10).
• If the fault persists check aircraft wiring between Waste Water Panel and the faulty drain mast
NO
8 Replace faulty (MID or AFT) drain mast heater switch-light (20-33-01)
NO
3 Remove appropriate drain mast (30-71-10). Is resistance to ground 3.22 to 3.94 ohms at connector pins
3071-J3-2 (mid 1),
3071-J3-4 (mid 2),
3071-J4-2 (aft 1), and
3071-J4-4 (aft 2)?
NO
9 Replace appropriate drain mast receptacle heater (30-71-10)
YES
4 With the appropriate drain mast removed, verify the resistance between the following pins is 27 ohms
P1-3 and 4 (MID 2 and AFT 2)
P1-1 and 2 (MID 1 and AFT 1)
NO
10 Replace appropriate drain mast heater (30-71-10).
• If the fault persists check aircraft wiring between Waste Water Panel and the faulty drain mast
YES
11 Replace faulty (MID or AFT) drain mast heater switch-light (20-33-01).
• If the fault persists check aircraft wiring between Waste Water Panel and the faulty drain mast
PREREQUISITES
Electrical Power (24-00-00)
CB's in: 2E13, 14 and 15
M1-0101-30-5018

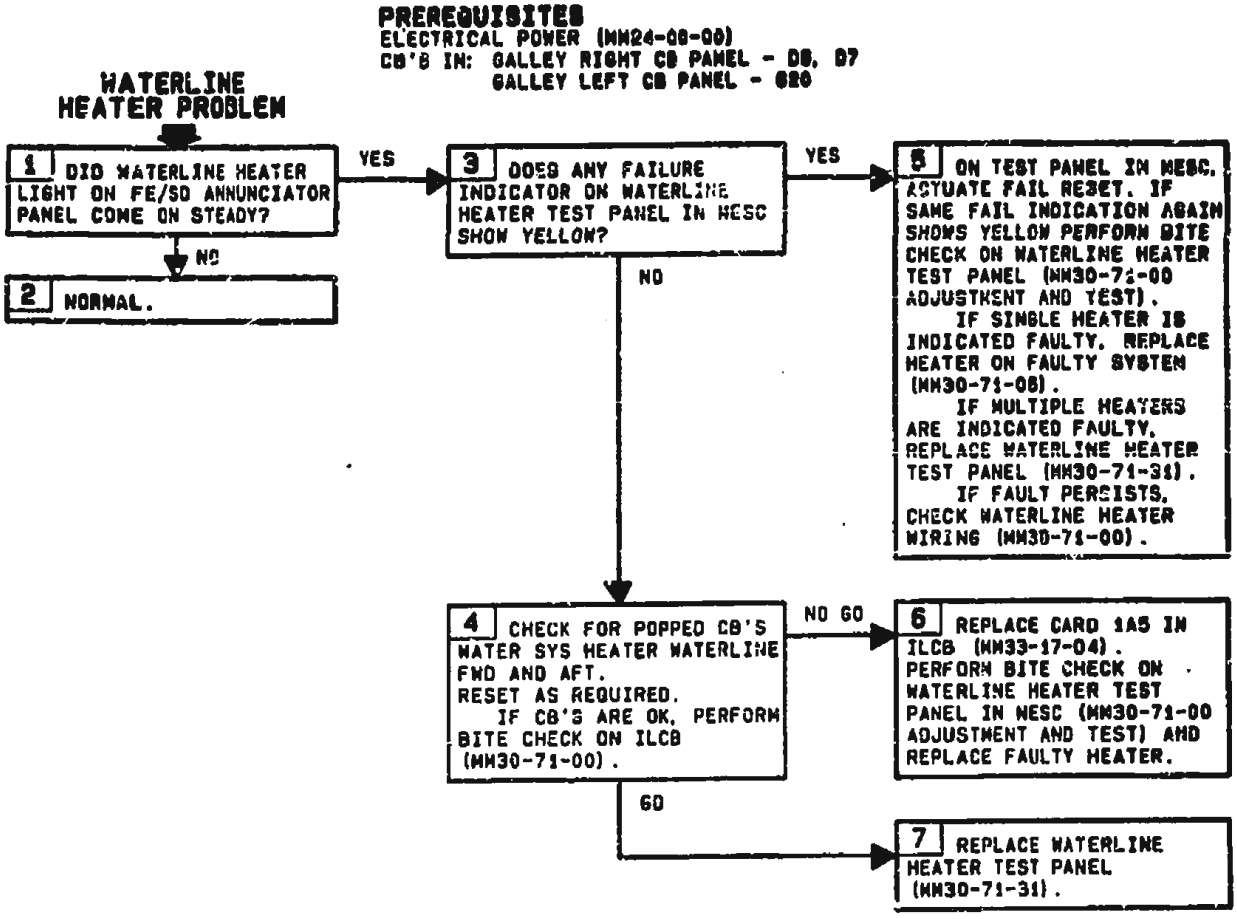
Waste Water Drain Mast Heater Light On
Figure 104

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB's IN: 2E13, 14 AND 16


DRAIN MAST HEATER LIGHT ON
1 DOES ILCB CARD 1A33 BITE CHECK OK?
YES
5 REPLACE ILCB CARD 1A33 (MM33-17-08).
YES
2 DO LIGHTS REMAIN ON FOR BOTH SWITCH POSITIONS?
YES
4 PULL AND TAG CB's DRAIN MAST HEATER MID AND AFT CB2-E14 AND E15.
REMOVE PLUG 9811-P279 FROM WASTE WATER PANEL ON FLIGHT ENGINEER/SECOND OFFICERS LOWER INSTRUMENT PANEL.
DEPRESS (LATCH IN) MID AND AFT DRAIN MAST HEATER SWITCHLIGHTS AND CHECK FOR CONTINUITY BETWEEN CONNECTOR
9811-J279 PINS 38 TO 19 FOR MID 1.
9811-J279 PINS 14 TO 22 FOR AFT 1.
RELEASE (OUT) MID AND AFT DRAIN MAST HEATER SWITCHLIGHTS AND CHECK FOR CONTINUITY BETWEEN CONNECTOR
9811-J279 PINS 38 TO 20 FOR MID 2.
9811-J279 PINS 14 TO 23 FOR AFT 2.
YES
6 REPLACE APPROPRIATE DRAIN MAST HEATER (MM30-17-10).
IF THE FAULT PERSISTS, CHECK AIRCRAFT WIRING BETWEEN WASTE WATER PANEL AND THE FAULTY DRAIN MAST.
NO
7 REPLACE FAULTY (MID OR AFT) DRAIN MAST HEATER SWITCHLIGHT (MM20-33-01).
NO
3 WITH THE APPROPRIATE DRAIN MAST REMOVED, VERIFY THE RESISTANCE BETWEEN THE FOLLOWING PINS IS 27 OHMS.
P1-3 AND 5 (MID 2 AND AFT 2).
P1-1 AND 5 (MID 1 AND AFT 1).
NO
8 REPLACE APPROPRIATE DRAIN MAST HEATER (MM30-17-10).
IF THE FAULT PERSISTS, CHECK AIRCRAFT WIRING BETWEEN WASTE WATER PANEL AND THE FAULTY DRAIN MAST.
YES
9 REPLACE FAULTY (MID OR AFT) DRAIN MAST HEATER SWITCHLIGHT (MM20-33-01).
IF THE FAULT PERSISTS, CHECK AIRCRAFT WIRING BETWEEN WASTE WATER PANEL AND THE FAULTY DRAIN MAST.

M1-0000-30-5200

R R Waste Water Drain Mast Heater Light On
Figure 104

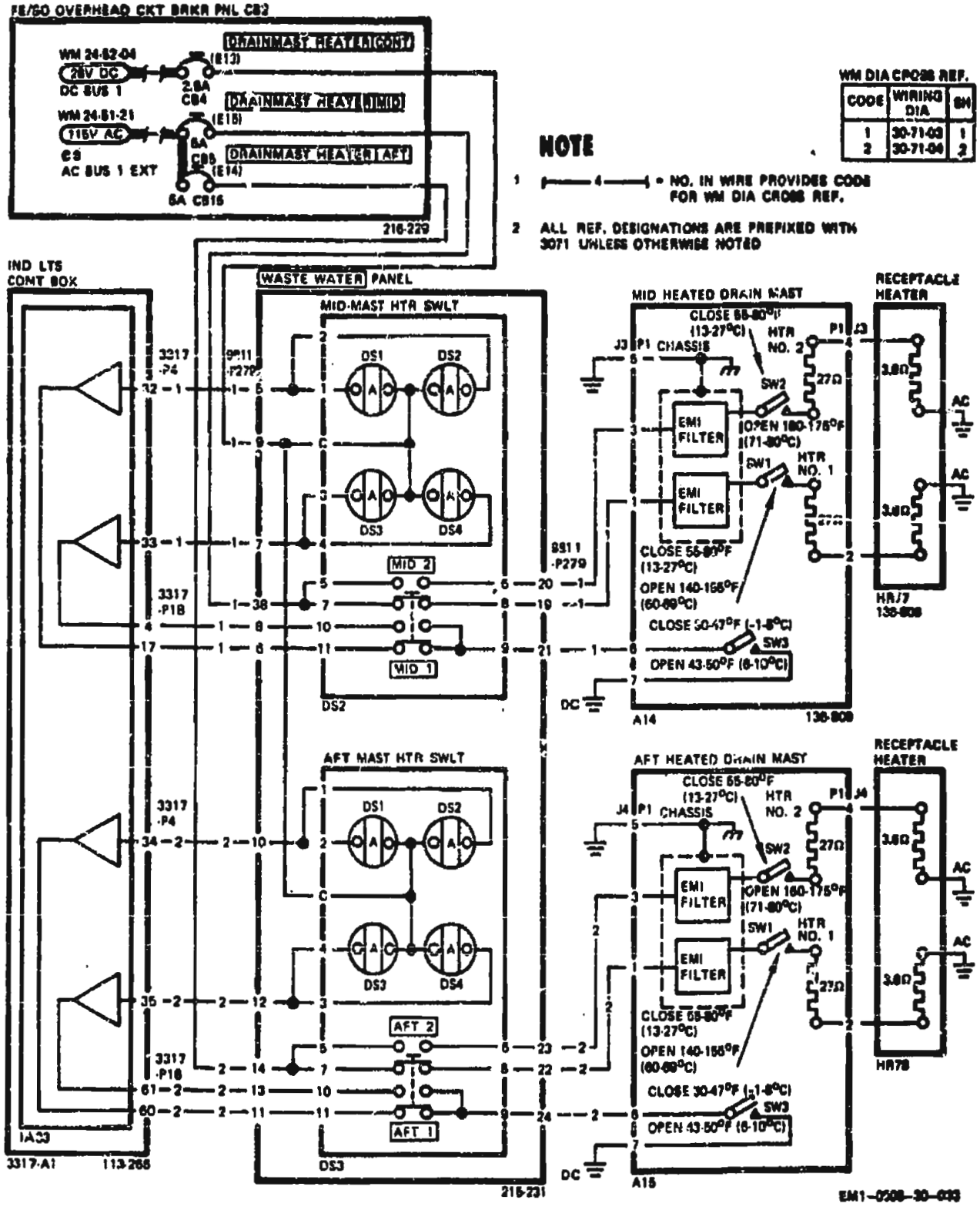

PREREQUISITES
ELECTRICAL POWER (MM24-00-00)
CB'S IN: GALLEY RIGHT CB PANEL - D8, D7
GALLEY LEFT CB PANEL - G20
WATERLINE HEATER PROBLEM
1 DID WATERLINE HEATER LIGHT ON FE/SD ANNUNCIATOR PANEL COME ON STEADY?
YES
NO
2 NORMAL.
3 DOES ANY FAILURE INDICATOR ON WATERLINE HEATER TEST PANEL IN NESC SHOW YELLOW?
YES
NO
5 ON TEST PANEL IN NESC, ACTUATE FAIL RESET. IF SAME FAIL INDICATION AGAIN SHOWS YELLOW PERFORM BITE CHECK ON WATERLINE HEATER TEST PANEL (MM30-71-00 ADJUSTMENT AND TEST).
IF SINGLE HEATER IS INDICATED FAULTY, REPLACE HEATER ON FAULTY SYSTEM (MM30-71-06).
IF MULTIPLE HEATERS ARE INDICATED FAULTY, REPLACE WATERLINE HEATER TEST PANEL (MM30-71-31).
IF FAULT PERSISTS, CHECK WATERLINE HEATER WIRING (MM30-71-00).
4 CHECK FOR POPPED CB'S WATER SYS HEATER WATERLINE FWD AND AFT.
RESET AS REQUIRED.
IF CB'S ARE OK, PERFORM BITE CHECK ON ILCB (MM30-71-00).
NO GO
6 REPLACE CARD 1A5 IN ILCB (MM33-17-04). PERFORM BITE CHECK ON WATERLINE HEATER TEST PANEL IN NESC (MM30-71-00 ADJUSTMENT AND TEST) AND REPLACE FAULTY HEATER.
GO
7 REPLACE WATERLINE HEATER TEST PANEL (MM30-71-31).

M1-0004-30-5015

R Waterline Heater Problem
R Figure 105

EFFECTIVITY: ALL

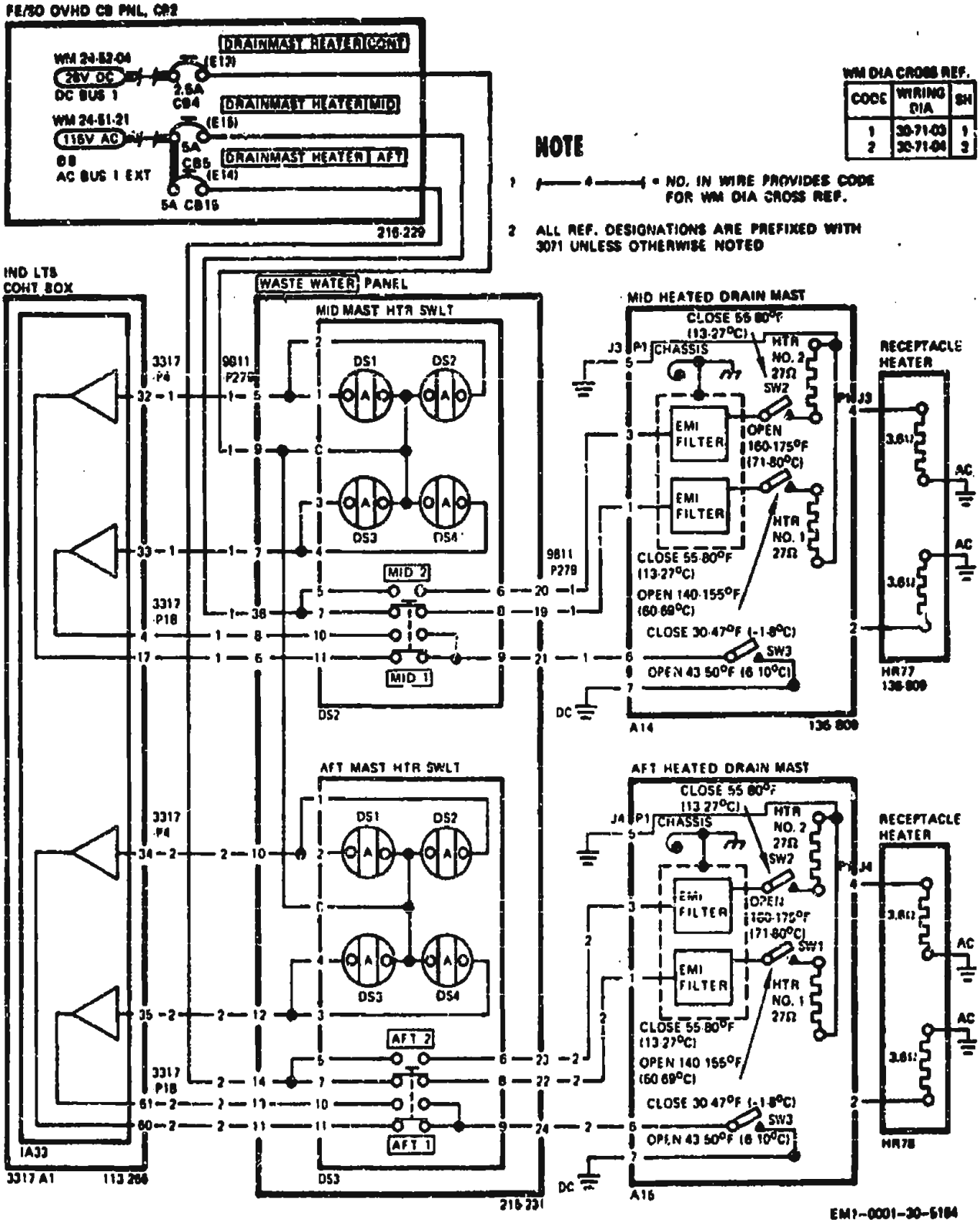
001B



Drain Mast Heater Schematic
SCHEM 1

R EFFECTIVITY: 001-031 WITHOUT SB30-048 R1

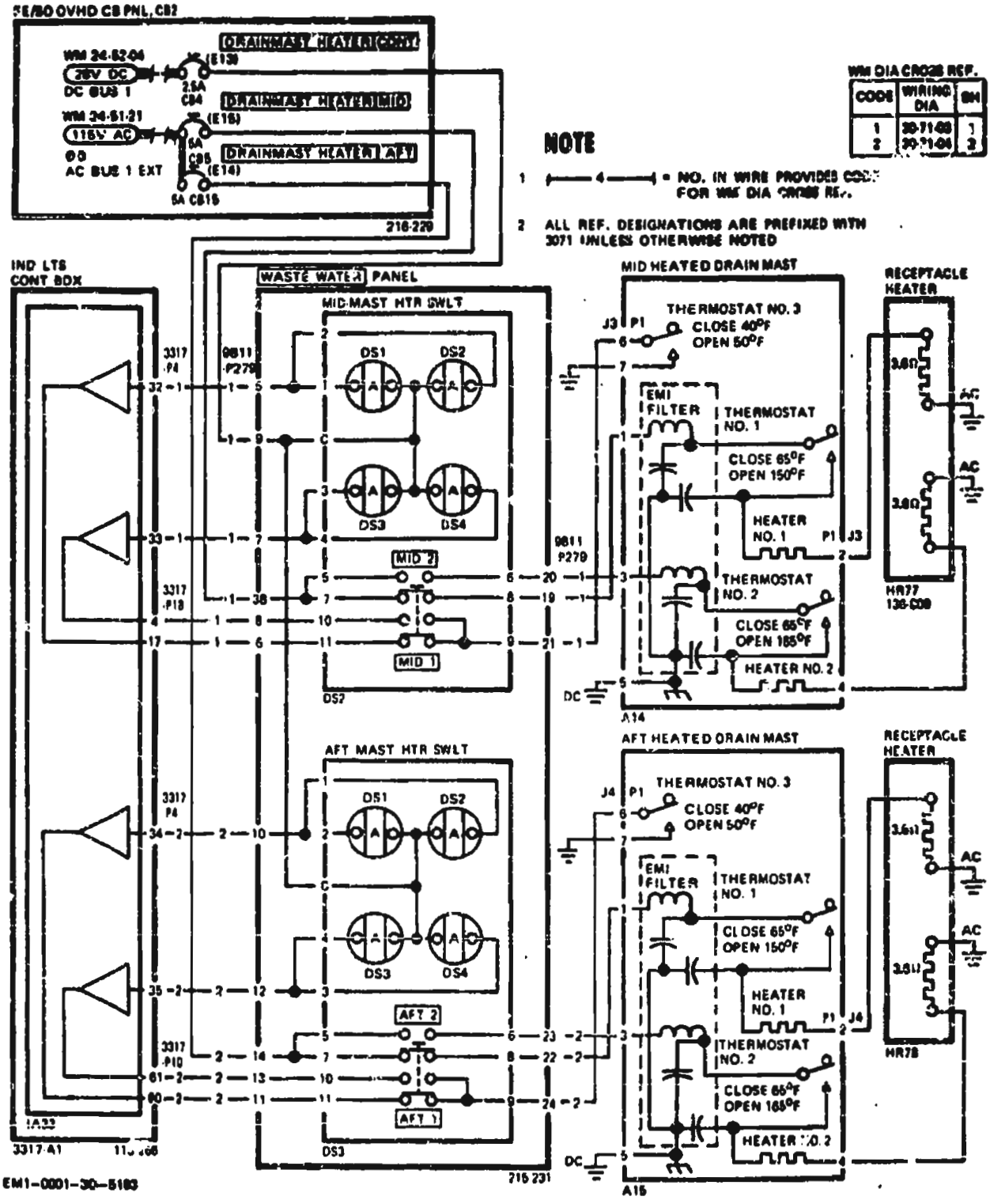
R
001B



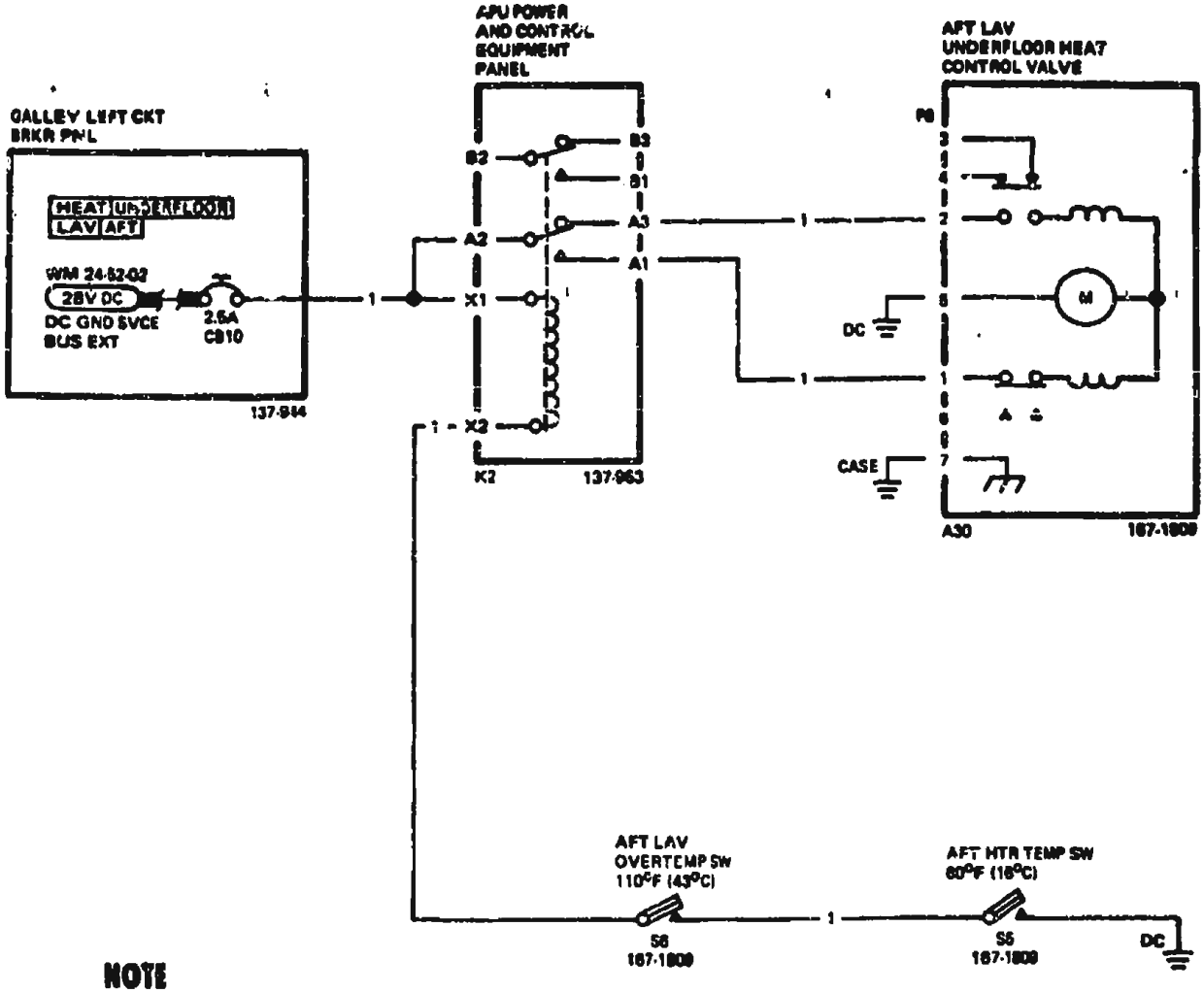
R Drain Mast Heater Schematic
R SCHEM 1

EFFECTIVITY: 001-031 WITH SB30-048 R1

001B



R R Drain Mast Heater Schematic
SCHEM 1



NOTE

1 ⟵4⟶ = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF

2 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3071 UNLESS OTHERWISE NOTED

WM DIA CROSS REF.

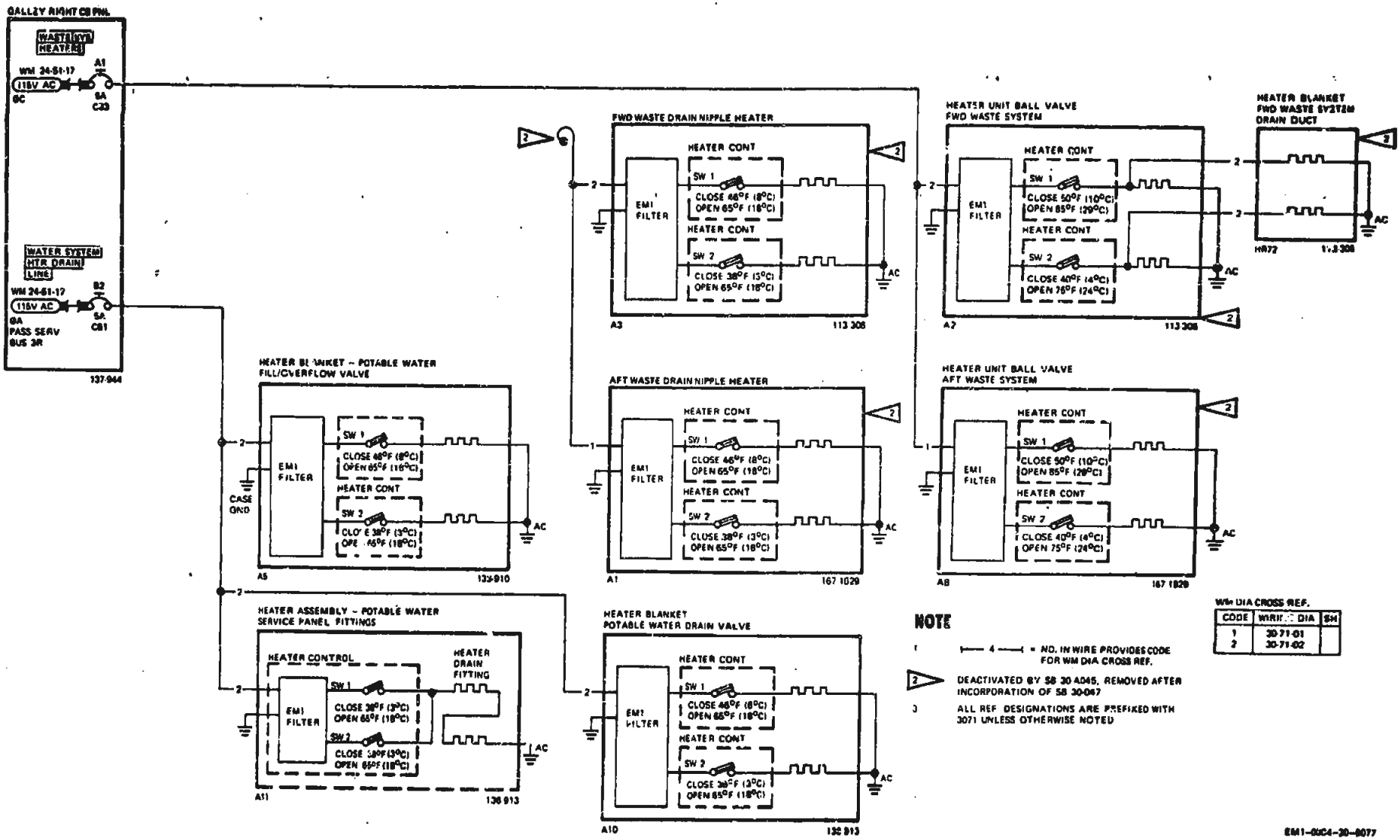
CODE	WIRING DIA	SH
1	20-71-10	1

EM1-0003-30-C84

R Aft Waste Compartment Heat Schematic
R SCHEM 2

EFFECTIVITY: ALL

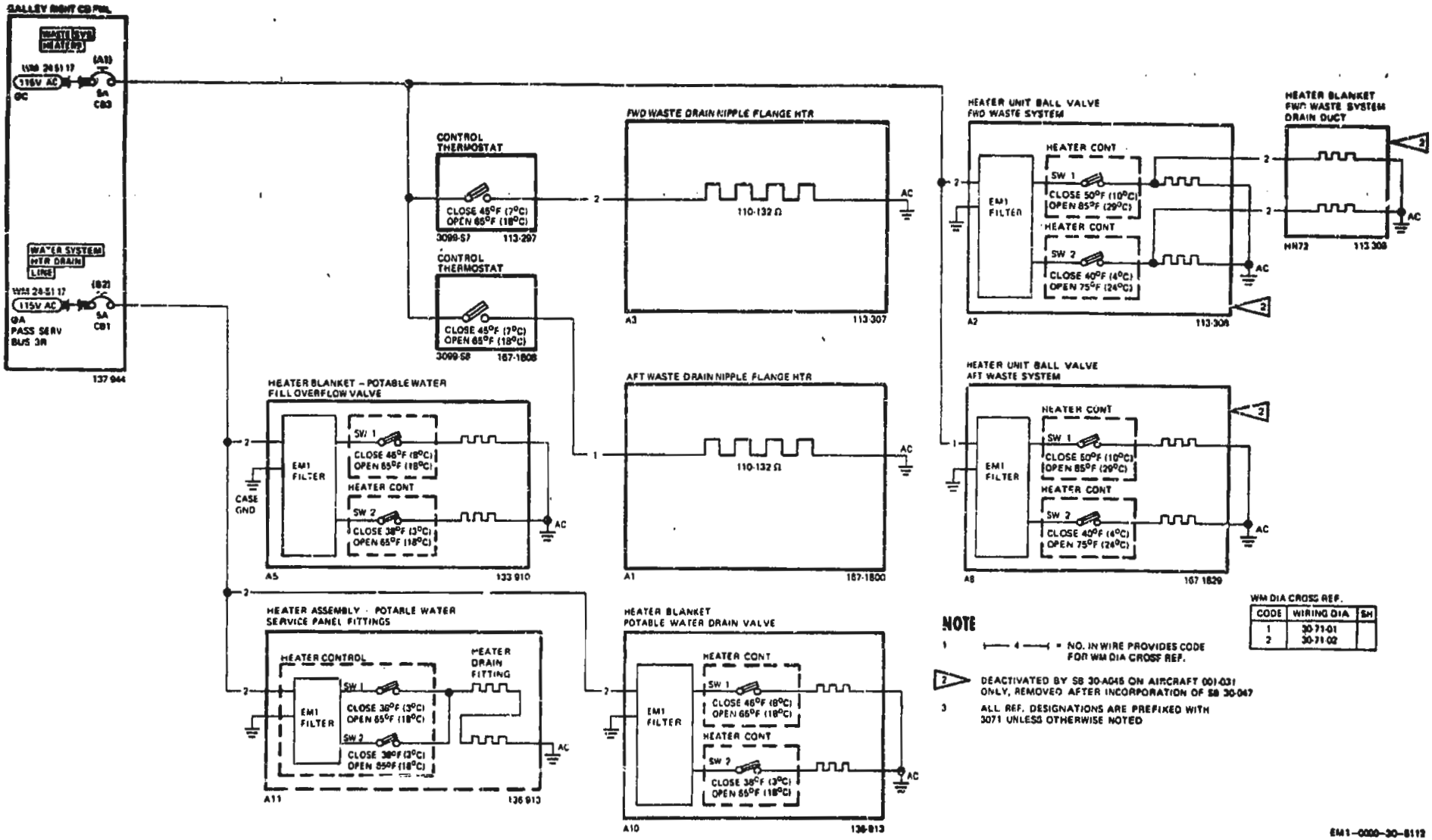
0018



CR Water Waste and Cargo Compartment Drains Schematic
CR SCHEM 3

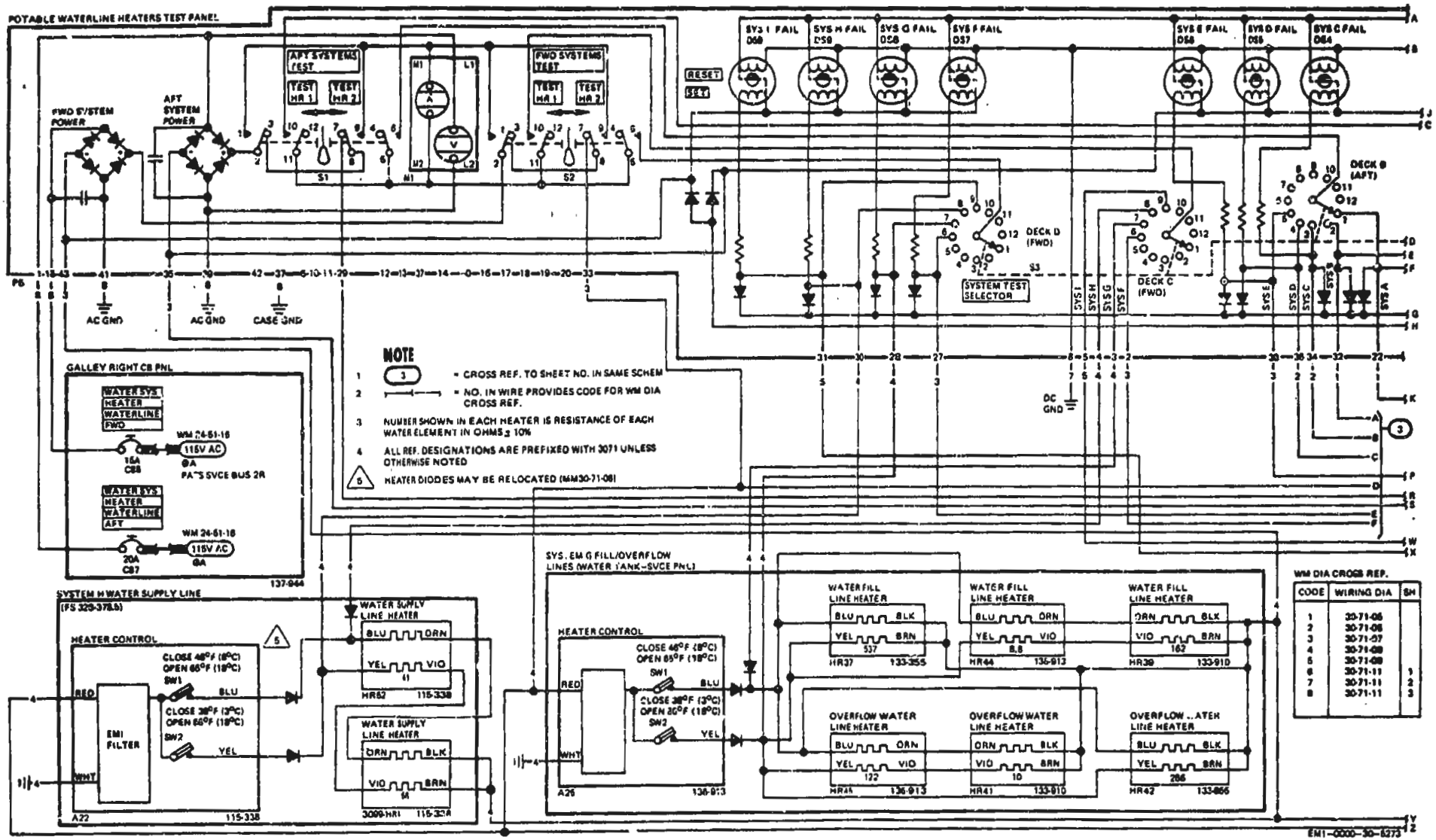
EFFECTIVITY: 001-031 WITHOUT SB30-050

001B



Water/Waste and Cargo Compartment Drains Schematic
SCHEM 3

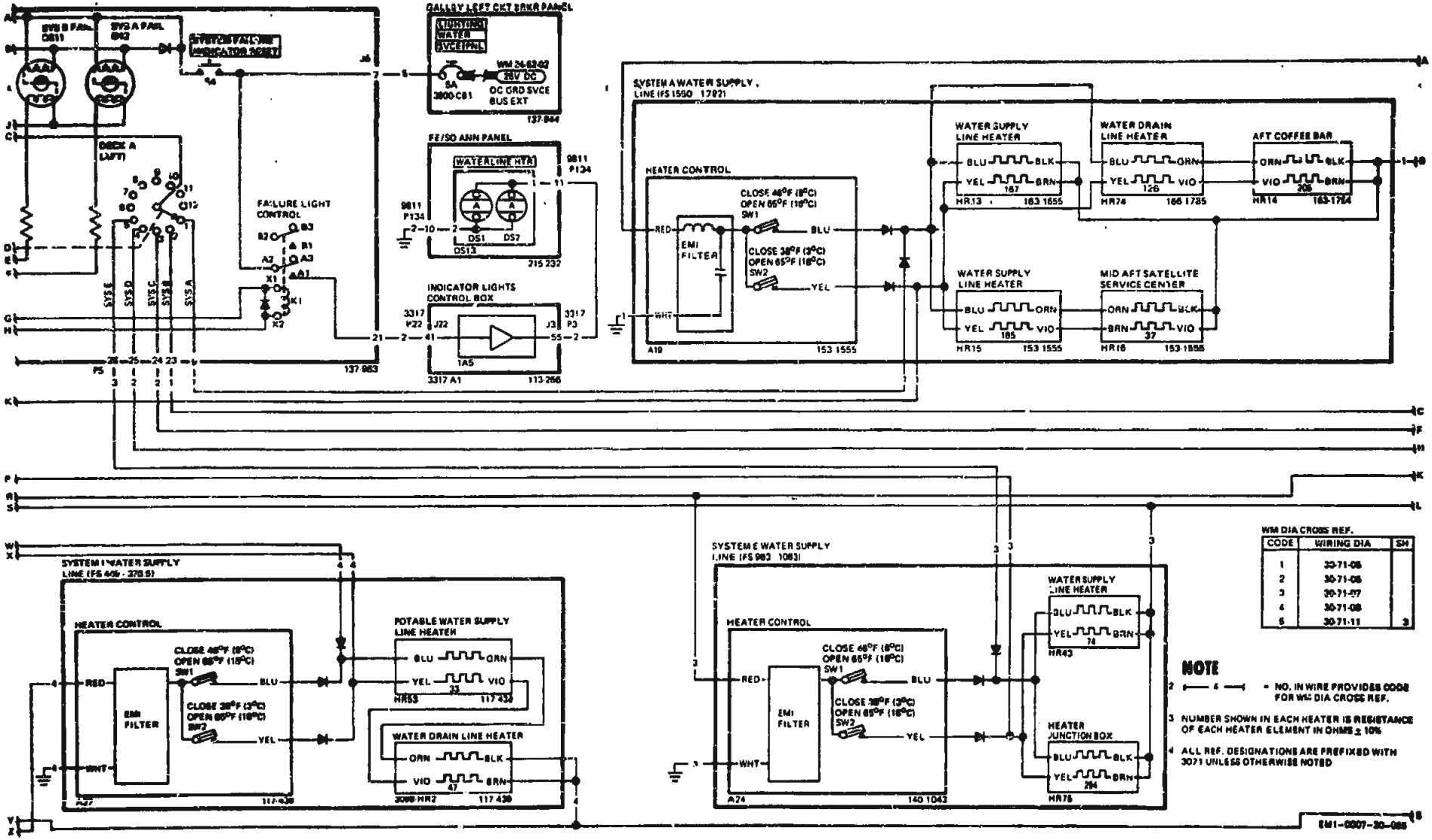
R EFFECTIVITY: 001-031 WITH SB30-050 AND 032-999
R
0016



CR Waterline Heater Schematic
CR SCHEM 4 (Sheet 1)

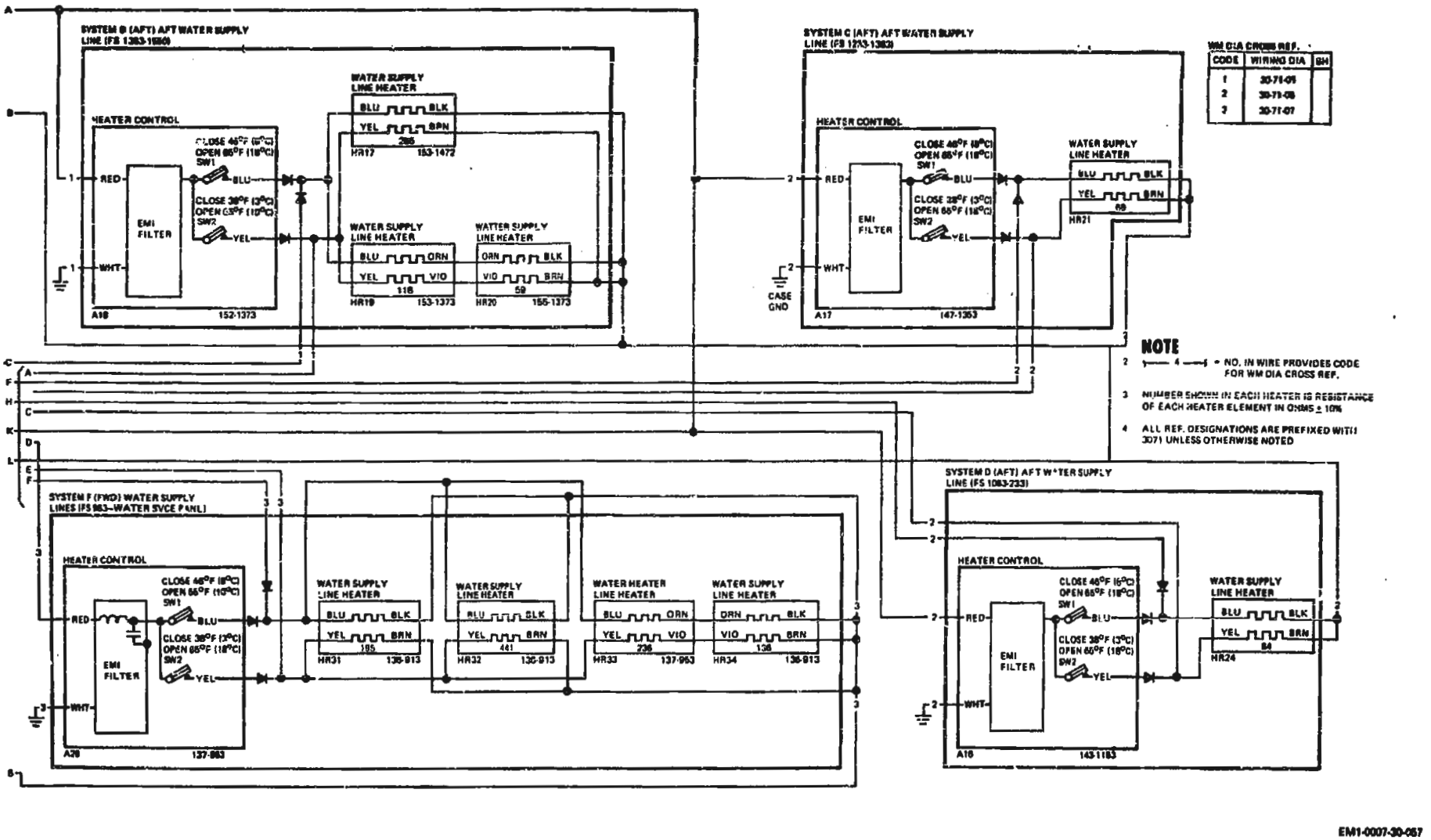
EFFECTIVITY: 001-024, 027

0018



Waterline Heater Schematic
SCHEM 4 (Sheet 2)

R EFFECTIVITY: 001-024, 027
R
001B

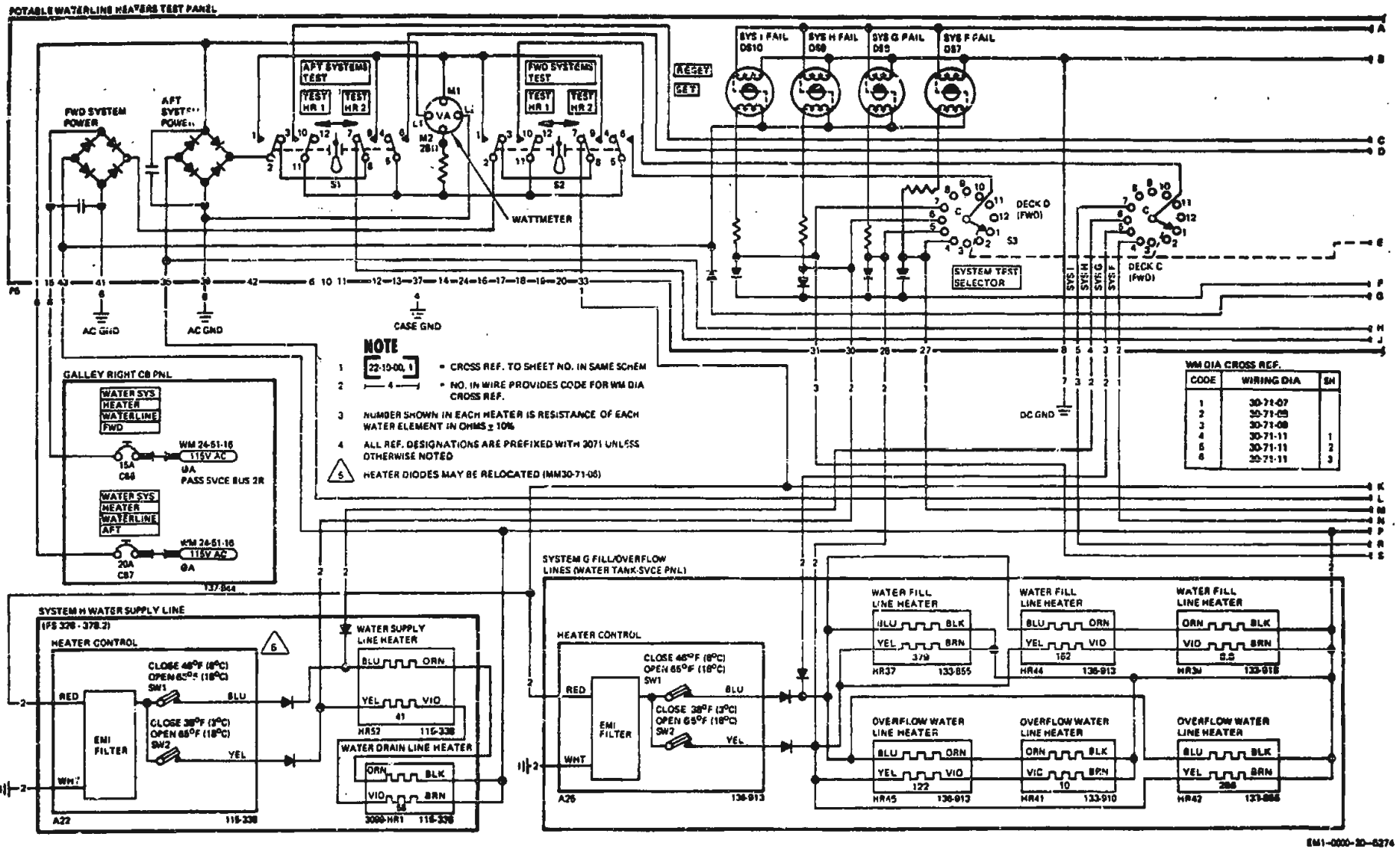


EM1-0007-30-057

R Waterline Heater Schematic
R SCHEM 4 (Sheet 3)

EFFECTIVITY: 001-024, 027

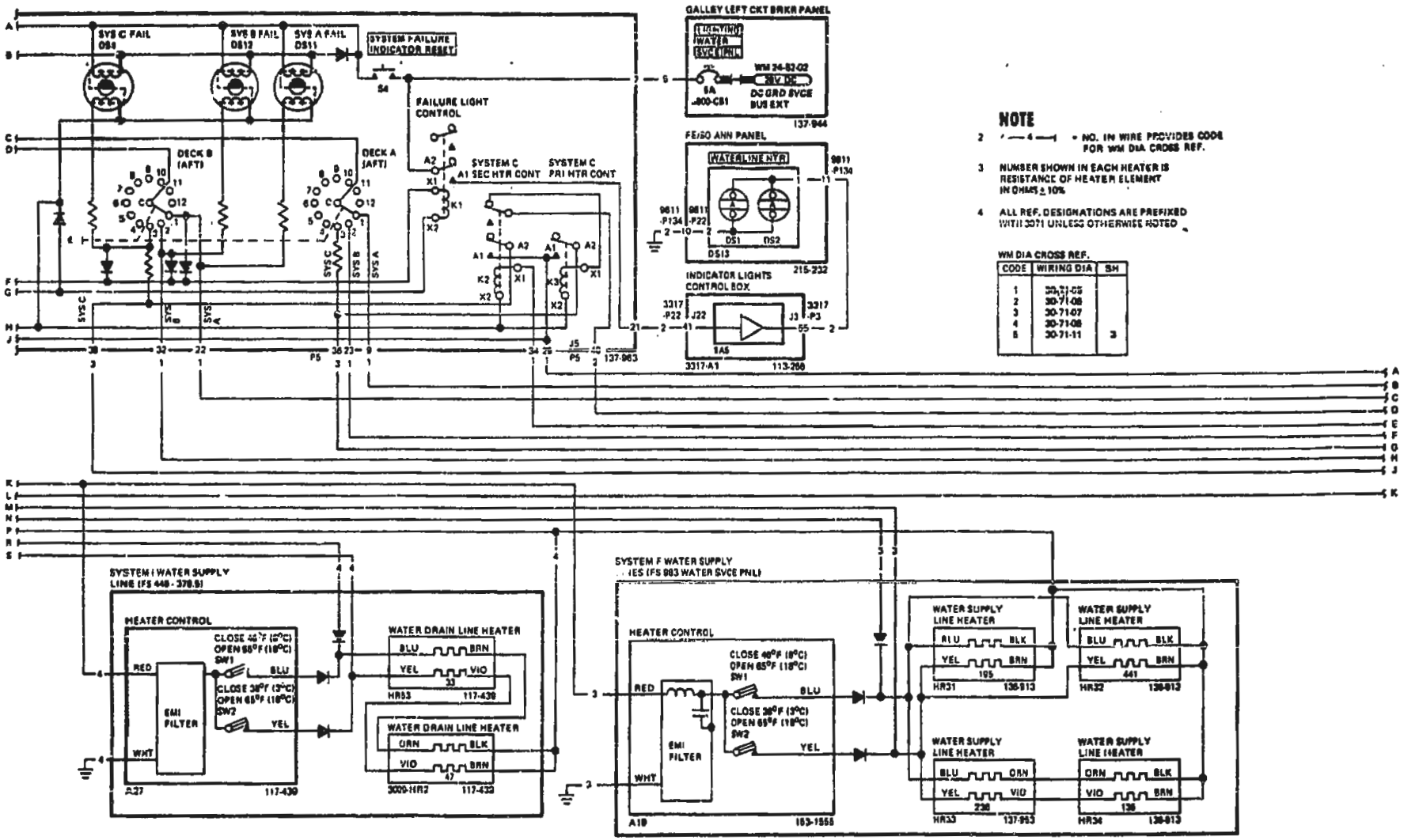
001B



EM1-0000-30-6274

C C Waterline Heater Schematic
SCHEM 4 (Sheet 1)

R EFFECTIVITY: 025-026, 028-999
R
001B


SYS C FAIL
SYS B FAIL
SYS A FAIL
SYSTEM FAILURE INDICATOR RESET
FAILURE LIGHT CONTROL
DECK B (AFT)
DECK A (AFT)
SYSTEM C A1 SEC HTR CONT
SYSTEM C PRI HTR CONT
GALLEY LEFT CKT BRKR PANEL
FE/SO ANN PANEL
WATERLINE NYR
INDICATOR LIGHTS CONTROL BOX
SYSTEM I WATER SUPPLY LINE (FS 440 - 378.5)
HEATER CONTROL
CLOSE 46°F (8°C) OPEN 65°F (18°C) SW1
CLOSE 38°F (3°C) OPEN 65°F (18°C) SW2
EMI FILTER
WATER DRAIN LINE HEATER
SYSTEM F WATER SUPPLY (ES (FS 983 WATER SVCE PNL)
WATER SUPPLY LINE HEATER

NOTE

2 —4— = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.

3 NUMBER SHOWN IN EACH HEATER IS RESISTANCE OF HEATER ELEMENT IN OHMS ± 10%

4 ALL REF. DESIGNATIONS ARE PREFIXED WITH 3071 UNLESS OTHERWISE NOTED

WM DIA CROSS REF.

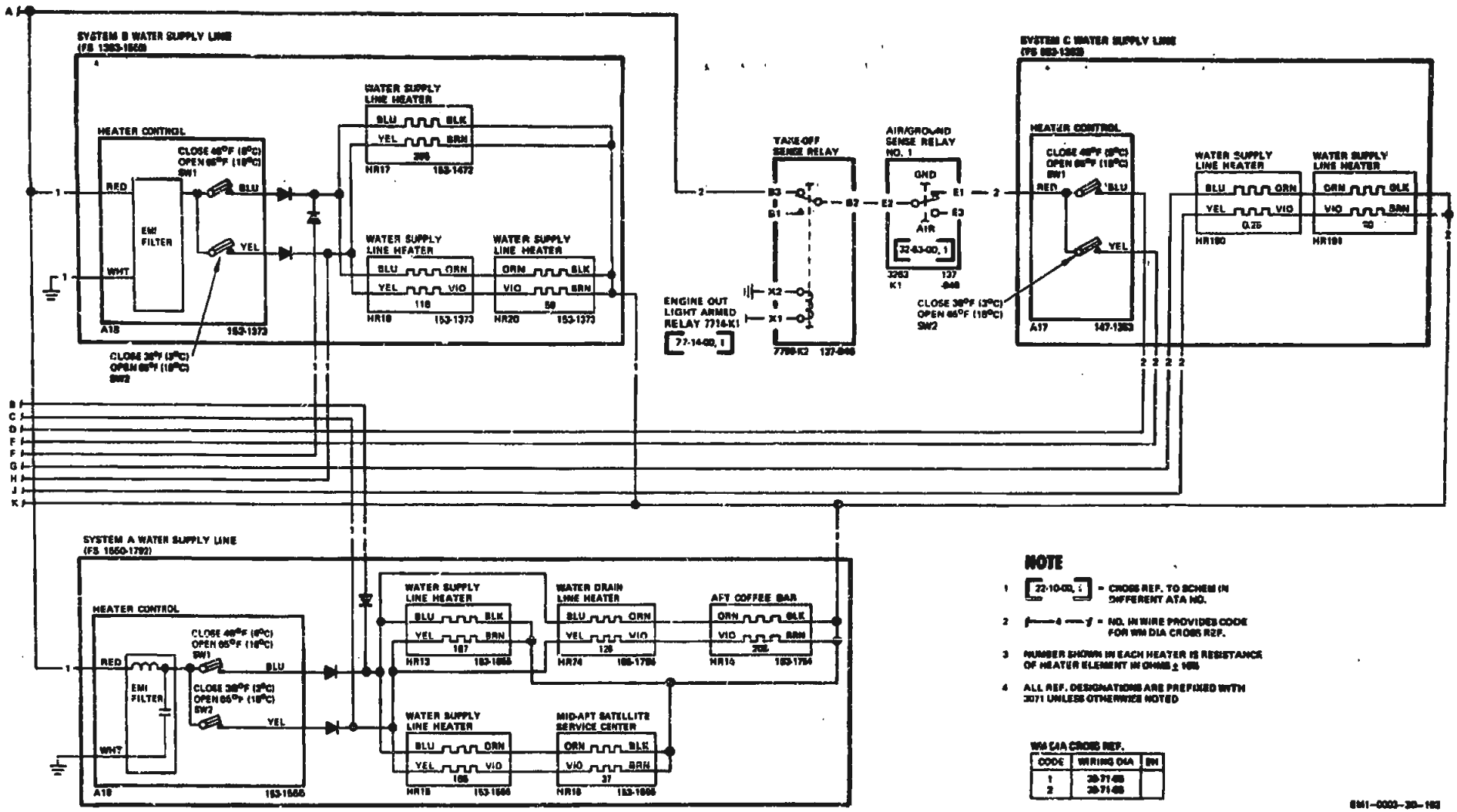
CODE	WIRING DIA	SH
1	[illegible]	
2	30-71-06	
3	30-71-07	
4	30-71-08	
5	30-71-11	3

EM1-0004-30-161

R R Waterline Heater Schematic
SCHEM 4 (Sheet 2)

EFFECTIVITY: 025-026, 028-999

001B



NOTE

1. [22-10-00, 1] = CROSS REF. TO SCHEM IN DIFFERENT ATA NO.
2. f—4—g = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
3. NUMBER SHOWN IN EACH HEATER IS RESISTANCE OF HEATER ELEMENT IN OHMS ± 10%
4. ALL REF. DESIGNATIONS ARE PREFIXED WITH 3071 UNLESS OTHERWISE NOTED

WM DIA CROSS REF.

CODE	WIRING DIA	SW
1	20-71-00	
2	20-71-00	

8M1-0000-30-102

Waterline Heater Schematic
SCHEM 4 (Sheet 3)

WATER SUPPLY/DRAIN LINE HEATERS - ADJUSTMENT AND TEST

1. General

This procedure is used to test the forward and aft water line heaters.

2. Referenced Procedures

24-41-00 External Power/Ground Service System - Maintenance Practices

3. Adjustment/Test

R A. BITE Test - Water Line Heaters

(1) Turn on electrical power (Ref. 24-41-00).

(2) On galley right circuit breaker panel, zone 130, verify that circuit breakers WATER SYS - HEATER WATERLINE - FWD (D6) and AFT (D7) are closed.

On galley left circuit breaker panel, zone 130, verify that circuit breaker LIGHTING - WATER SVCE PNL (G20) is closed.

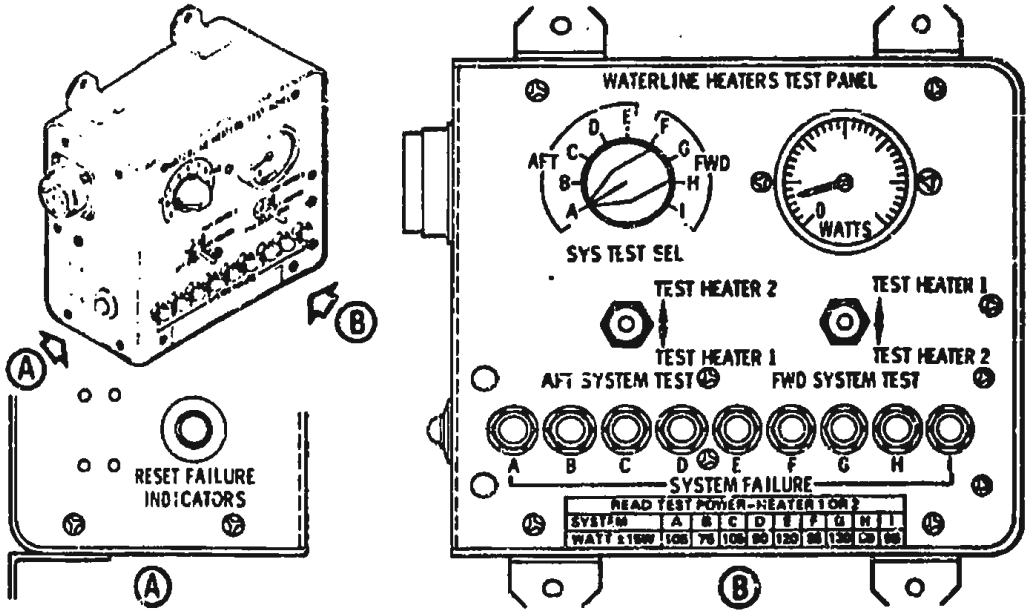
(3) On Flight Engineer/Second Officers annunciator panel, zone 215, test WATER LINE HTR lamp by actuating LIGHTS test switch.

(4) On WATERLINE HEATERS TEST PANEL, located in mid electrical service center, zone 137, verify that all SYSTEM FAILURE indicators are black (Ref. Fig. 501).

NOTE: If any SYSTEM FAILURE indicator is yellow, depress RESET FAILURE INDICATORS pushbutton to reset failure indicator.

(5) Sequentially rotate SYS TEST SEL switch through AFT positions A through E. For each position place AFT SYSTEM TEST switch to TEST HEATER 1 and verify that the wattmeter reading corresponds to the READ TEST POWER chart.

(6) Sequentially rotate SYS TEST SEL switch through FWD positions F through I. For each position place FWD SYSTEM TEST switch to TEST HEATER 1 and verify that the



MA 3877
M1-7402-30-096

R Waterline Heaters Test Panel
R Figure 501

EFFECTIVITY: 001-024, 027

wattmeter reading corresponds to the READ TEST POWER chart.

(7) Sequentially rotate SYS TEST SEL switch through FWD positions I through F. For each position place FWD SYSTEM TEST switch to TEST HEATER 2 and verify that:

(a) Wattmeter reading corresponds to READ TEST POWER chart.

(b) SYSTEM FAILURE indicator changes from black to yellow.

(c) WATER LINE HTR indicator on Flight Engineer/Second Officers annunciator panel comes on.

(8) Sequentially rotate SYS TEST SEL switch through AFT positions E through A. For each position place AFT SYSTEM TEST switch to TEST HEATER 2 and verify that:

(a) Wattmeter reading corresponds to READ TEST POWER chart.

(b) SYSTEM FAILURE indicator changes from black to yellow.

(c) WATER LINE HTR indicator on Flight Engineer/Second Officers annunciator panel comes on.

(9) Reset SYSTEM FAILURE indicators to black by momentarily depressing the RESET FAILURE INDICATORS switch.

(10) Turn off electrical power (Ref. 24-41-00).

WATER SUPPLY/DRAIN LINE HEATERS - ADJUSTMENT AND TEST

1. General

This procedure is used to test the forward and aft water line heaters.

R NOTE: Waterline heater systems A, B and F are not installed on
R aircraft 032-999.

2. Referenced Procedures

24-41-00 External Power/Ground Service System - Maintenance Practices

3. Adjustment/Test

A. BITE Test - Water Line Heaters

(1) Turn on electrical power (Ref. 24-41-00).

(2) Verify that the following circuit breakers are closed.

On galley right circuit breaker panel, zone 137:

WATER SYS - HEATER - WATERLINE - FWD (D6),

WATER SYS - HEATER - WATERLINE - AFT (D7).

On galley left circuit breaker panel, zone 137:

LIGHTING - WATER - SVCE - PNL (G20).

(3) On Flight Engineer/Second Officers annunciator panel, zone 215, test WATER LINE HTR lamp by actuating LIGHTS test switch.

(4) On WATERLINE HEATERS TEST PANEL, located in mid electrical service center, zone 137, verify that all SYSTEM FAILURE indicators are black (Ref. Fig. 501).

NOTE: If any SYSTEM FAILURE indicator is yellow, depress RESET FAILURE INDICATORS pushbutton to reset failure indicator.

(5) Sequentially rotate SYS TEST SEL switch through AFT positions A through C. For each position place AFT

switch to position 1 and verify that the wattmeter reading corresponds to the READ TEST POWER chart.

(6) Sequentially rotate SYS TEST SEL switch through FWD positions F through I. For each position place FWD switch to position 1 and verify that the wattmeter reading corresponds to the READ TEST POWER chart.

(7) Sequentially rotate SYS TEST SEL switch through FWD positions I through F. For each position place FWD switch to position 2 and verify that:

(a) Wattmeter reading corresponds to READ TEST POWER chart.

(b) SYSTEM FAILURE indicator changes from black to yellow.

(c) WATER LINE HTR indicator on Flight Engineer/Second Officers annunciator panel comes on.

(8) Sequentially rotate SYS TEST SEL switch through AFT positions C through A. For each position place AFT switch to position 2 and verify that:

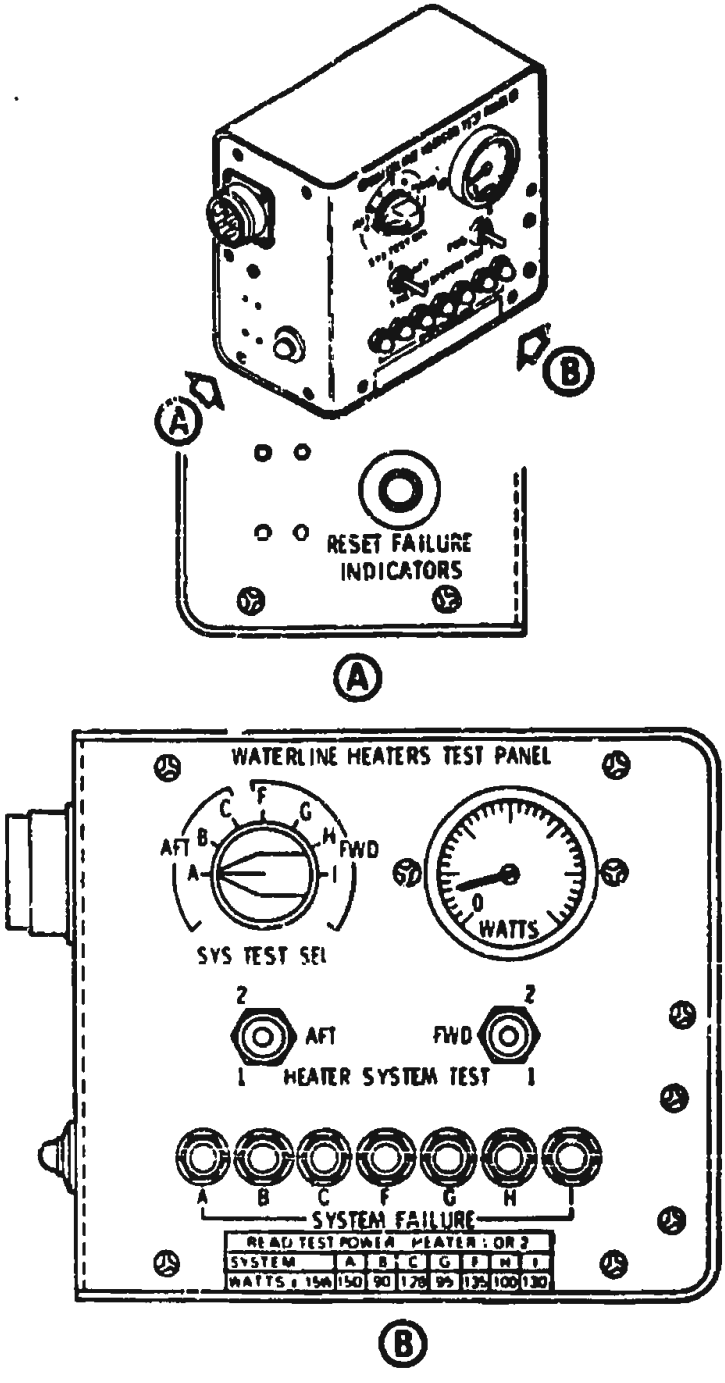
(a) Wattmeter reading corresponds to READ TEST POWER chart.

(b) SYSTEM FAILURE indicator changes from black to yellow.

(c) WATER LINE HTR indicator on Flight Engineer/Second Officers annunciator panel comes on.

(9) Reset SYSTEM FAILURE indicators to black by momentarily depressing the RESET FAILURE INDICATORS switch.

(10) Turn off electrical power (Ref. 24-41-00).



NOTE
WATERLINE HEATER SYSTEMS A, B AND F ARE NOT INSTALLED ON AIRCRAFT 032-999.

M1-0000-30-300

R
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Waterline Heater Test Panel
Figure 501

EFFECTIVITY: 025-026, 028-999

FILL/OVERFLOW VALVE HEATER BLANKET - REMOVAL AND INSTALLATION

1. Equipment and Materials

Bulk fiber glass insulation material, one-half-inch thick, MIL-B-5924, Type I, or equivalent

Bulk covering, LAC Spec C-22-12548, Type I, or equivalent

Tape, 2-inch wide, Pressure-sensitive, Orcon OT-2, or equivalent

Wire, 0.025-inch diameter Fed Spec QQ-W-423, or equivalent

Ohmmeter, Simpson Model 260 or equivalent

2. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 130, open and tag circuit breaker WATER SYSTEM HEATERS.

(2) Above galley sink, unlatch and swing paper towel dispenser away from bulkhead to gain access to fill/overflow valve.

(3) Remove tape, cover, and insulation from fill/overflow valve heater blanket (Ref. Fig. 401).

(4) Disconnect and tag heater blanket wires at terminal module.

R CAUTION: KEEP FLEXING OF HEATER BLANKET TO A MINIMUM.

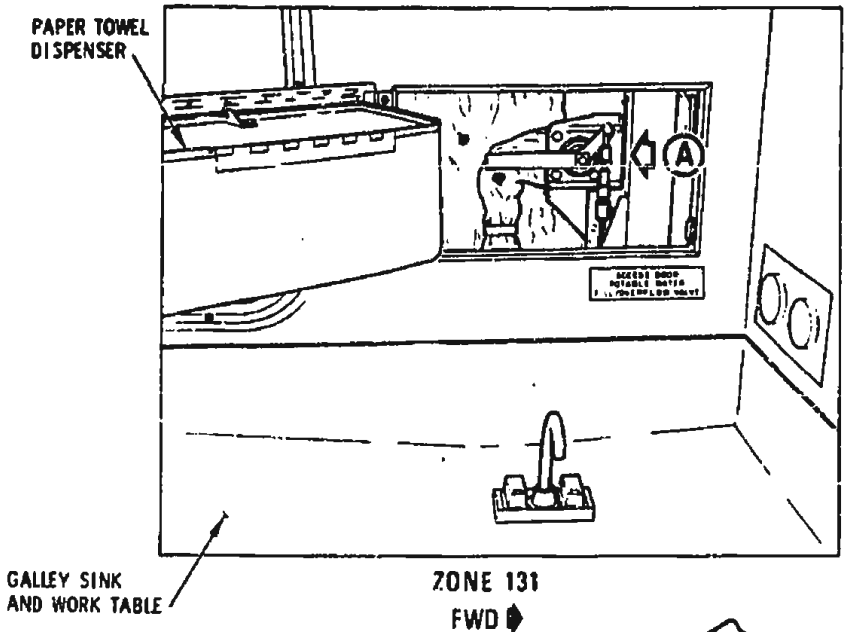
(5) Unlace wire and remove heater blanket.

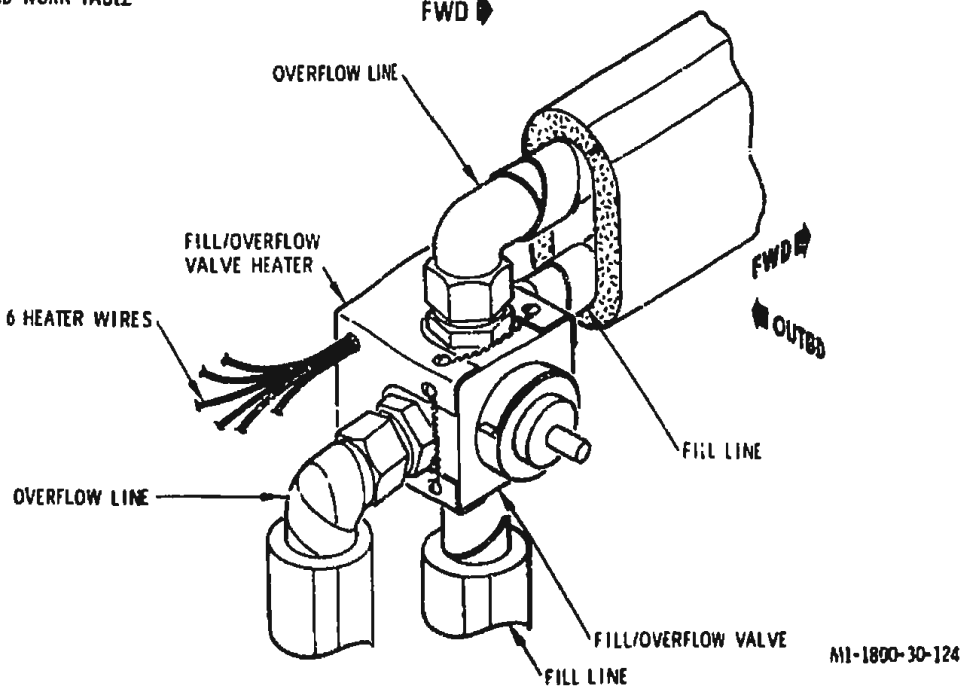
B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Install heater blanket on fill/overflow valve and lace closed.

(3) Test heater for continuity after installation and before connecting wires. Check between the green and black leads for the primary heater circuit. Check between the yellow and brown leads for the secondary





R Fill/Overflow Valve Heater Blanket - Removal and Installation
R Figure 401

R heater circuit. The resistance range is 596 to 728
R ohms.

R (4) Remove tags and connect heater wires to terminal
R module.

R (5) Install insulation and cover on heater blanket and seal
R the seam with tape.

R (6) Latch paper towel dispenser closed.

R (7) Remove tag and close circuit breaker opened in Step 2A(1).

POTABLE WATER LINE HEATERS - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for all water line heaters (Ref. Fig. 401).

The water lines below the galley floor must be removed to install and remove the heaters (Ref. Fig. 402). The below galley floor water lines are routed through a shroud so they can be installed and removed without removing the galley floor. After disconnecting the electrical wires and the water line coupling, the lines can be pulled out through the shroud.

NOTE: Waterline heater systems A, B and F are not installed on aircraft 032-999.

2. Equipment and Materials

Bulk fiber glass insulation material, one-half inch thick, MIL-B-5924, Type I, or equivalent

Bulk covering, LAC Spec C-22-1254B, Type I, or equivalent

CR Tape, 3M474, pressure-sensitive, 2 inches wide, or equivalent

Wire, 0.025-inch diameter, QQ-W-423, or equivalent

3. Referenced Procedure

30-71-00 Water/Waste System - Adjustment and Test

4. Location/Access

System A Heaters are in the Aft Waste Compartment, and along the left side of the Bulk Cargo Compartment and part of the Mid Cargo Compartment.

System B Heaters are in the Mid Cargo Compartment.

System C Heaters goes through the Hydraulic Service Center.

The single System D Heater goes between the Hydraulic Service Center and the aft wall of the MESC.

System E Heaters extend from left to right through the MESC.

System F Heaters extend from the MESC to the Potable Water Service Panel.

System G Heaters are on the fill and overflow lines from the tank to the service panel.

System H and I Heaters are placed on supply and drain lines through the Left Hand ECS Compartment.

Location of heater systems is indicated by decals on the outside of the heated water lines, or on nearby structure, giving the heater part number and the heater system letter. Access panels for each system are tabulated in Table 401.

5. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 130, open and tag circuit breakers WATER SYS - HEATERS - WATER LINE - FWD (D6) and AFT (D7).

(2) Remove tape, cover, and insulation from water line heater.

(3) Disconnect and tag heater wires at terminal module.

(4) Disconnect and tag heater controller wires at terminal module.

(5) On aircraft 007-999, unlace and remove boot from controller.

(6) Remove nuts and screws to remove controller from water line.

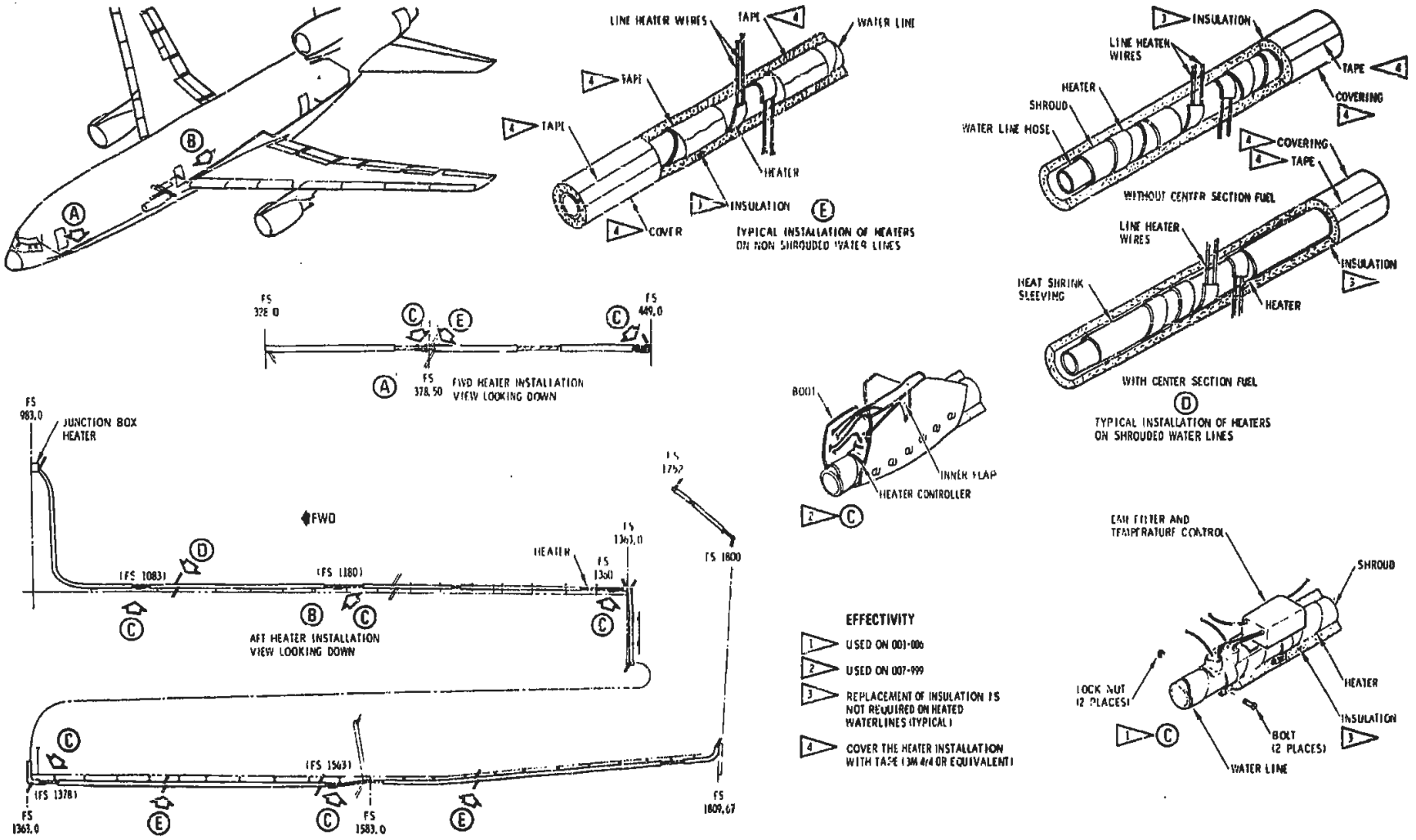
(7) Remove tape from ends of heater and unwrap heater from water line.

B. Installation

(1) Verify that circuit breakers opened in Step 4A(1) are open and tagged.

CR CR (2) Wrap heater on water line and cover the heater installation with tape (3M474 or equivalent).

(3) Install heater controller on water line. The thermostat must be in direct contact with the water line.

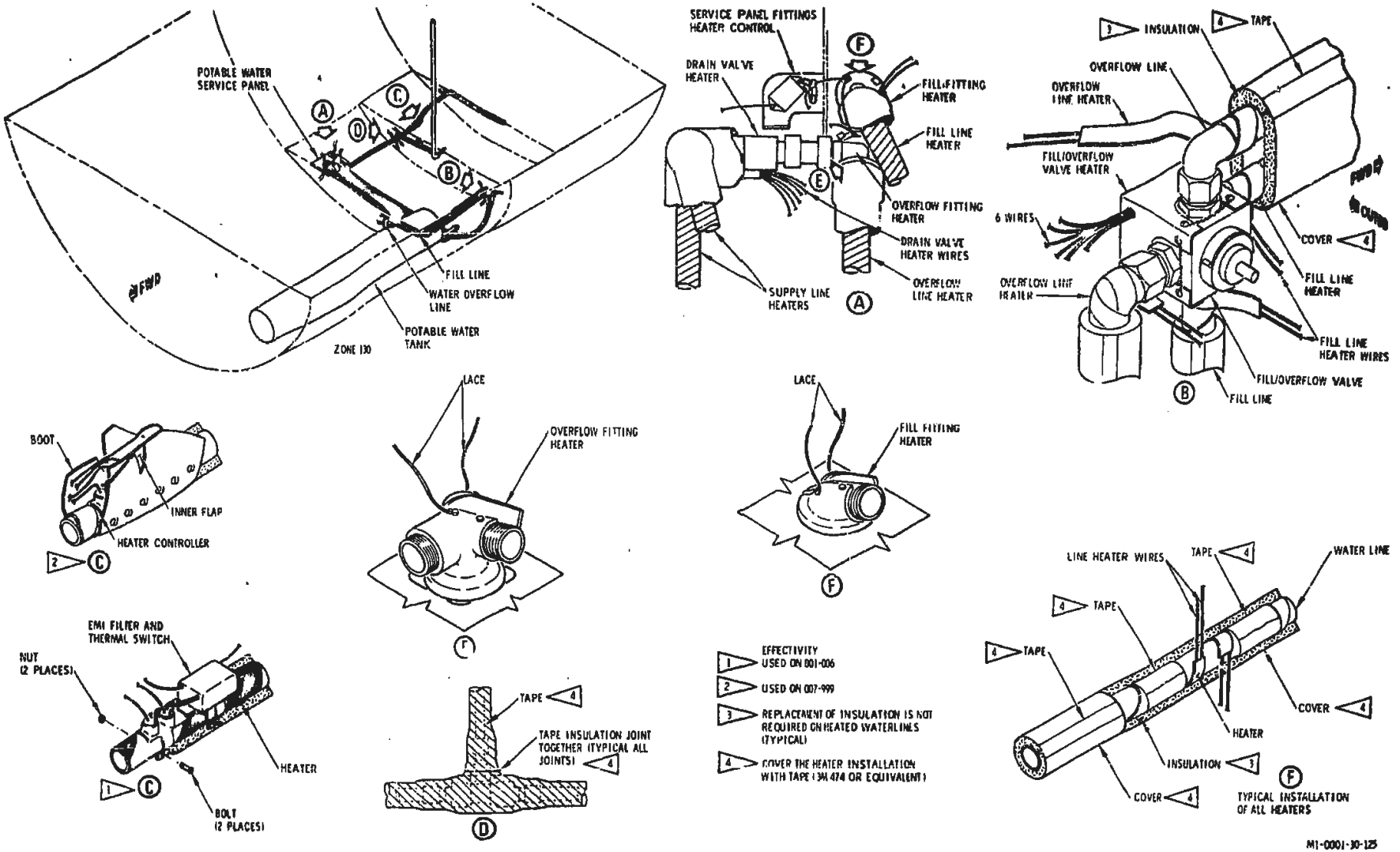


M1-0003-30-060

CR Potable Water Line Heaters - Removal and Installation
CR Figure 401

EFFECTIVITY: ALL

001B



CR Below-floor Water Line Heaters - Removal and Installation
CR Figure 402

EFFECTIVITY: ALL

001B

SYS	LOCATION (FS)	HEATER 1 DESIGNATION	CONTROLLER DESIGNATION	ACCESS
A	1550-1809	3071-HR13, 14, 15, 16, 74	3071-A19	IN C3 CARGO COMPARTMENT REMOVE LEFT SIDEWALL PANEL 163AL, 163BL AND IN C2 CARGO COMPARTMENT REMOVE LEFT SIDEWALL PANEL 153FL AND 153HL
B	1363-1550	3071-HR17, 19, 20	3071-A18	IN C2 CARGO COMPARTMENT REMOVE FORWARD PANEL 151A AND LEFT SIDEWALL PANEL 153DL
C	1223-1363	3071-HR21	3071-A17	IN HYDRAULIC SERVICE CENTER LEFT SIDE, BL42L
D	1083-1223	3071-HR24	3071-A16	SAME AS SYSTEM C AND E
E	983-1083	3071-HR43, 75	3071-A24	OPEN EXTERNAL ACCESS PANEL 142DB (ACCESS TO FORWARD END OF WING BOX BEAM, ZONE 142)
F	930-983	3071-HR31, 32, 33, 34	3071-A26	REMOVE PAN ASSEMBLY UNDER RIGHT GALLEY LIFT, GALLEY FLOOR PANEL 136GT AND MESC FLOOR PANEL 137GT
G	900-846	3071-HR37, 39 41, 42, 44, 45	3071-A25	REMOVE GALLEY FLOOR PANEL 136ET, WATER TANK ACCESS PANEL

NOTE:
WATERLINE HEATER SYSTEMS A, B, AND F ARE NOT INSTALLED ON AIRCRAFT 032-999.

M1-0000-30-304

R
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Water Supply and Drain Line Heaters
Table 401 (Sheet 1)

EFFECTIVITY: ALL

001B

SYS	LOCATION (FS)	HEATER 1 DESIGNATION	CONTROLLER DESIGNATION	ACCESS
H	328-378	3071-HR52 3099-HR1	3071-A22 3099-A43 3099-A44	REMOVE NO. 1 DUAL HEAT EXCHANGER (REF. 21-51-01) ⚠1
1	378-449	3071-HR53 3099-HR2	3071-A27	OPEN LEFT ECS COMPARTMENT ACCESS DOOR

NOTE

⚠1 HEATER DIODES MAY BE RELOCATED (MM 30-71-06)

M1-0000-30-5272

CR
CR

Water Supply and Drain Line Heaters
Table 401 (Sheet 2)

EFFECTIVITY: ALL

001B

C (a) For H and I zone heaters, assure that all bulkhead
C heaters at both ends of the waterline are tight on
C the line and firmly against the bulkhead. H zone
C heater diodes and associated terminal blocks
C should be relocated from heat exchanger
C compartment TB53 to left ECS compartment TB52
C anytime heat exchanger is removed for maintenance.

(4) On below galley floor water lines, wrap tape around entire heater in a reverse spiral to heater.

(5) On aircraft 007-009, install boot around controller.

(a) Wrap inner flap around controller.

(b) Fold outer flaps in sequence, as numbered 1 through 4.

(c) Wrap wire approximately three times around one end of boot.

(d) Lace flaps on boot together.

(e) Wrap wire approximately three times around second end of boot.

(6) Remove tags and connect heater wires and EMI filter and thermal switch wires to terminal module.

(7) Install insulation and cover on heater and seal seam with tape.

CR NOTE: Insulation and cover not required on heated
CR waterlines wrapped with tape (3M474 or
CR equivalent).

(8) Remove tags and close circuit breakers opened in Step 4A(1).

(9) Test water line heaters (Ref. 30-71-00).

R CARGO COMPARTMENT DRAIN HEATER - REMOVAL AND INSTALLATION

1. General

The cargo compartment drains are on the lower fuselage at FS699, FS1621, and FS1661. The compartment drain heaters have been deactivated by ALERT SB30-A032; instructions for reactivating the heaters are contained in SB30-034.

DRAIN MAST HEATER - REMOVAL AND INSTALLATION

1. General

The drain mast heater consists of two parts. The drain mast has an integral heater that must be replaced at overhaul maintenance. The aircraft receptacle, which interfaces the fuselage and drain mast, has a collar shaped heater.

Removal and installation procedures are the same for both the mid and aft drain masts. The mid drain mast is located on the lower fuselage at FS 846, LBL 12. The aft drain mast is on the lower fuselage at FS 1792, RBL 30.

On some aircraft, drain mast is installed with a spacer and adapter plate (LAC PN 673300-101, Mfr PN 8921620G1) (Ref. Fig. 401). When this condition exists, the spacer and adapter plate should be removed/installed with the drain mast. This drain mast assembly is interchangeable with LAC PN 673300-103, Mfr PN 8921630G1, which is a single unit without spacer and adapter.

2. Equipment and Materials

Petrolatum, VV-P-236, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

Ohmmeter, Simpson Model 260 or equivalent

3. Referenced Procedure

R 20-51-04 Environmental Sealing of Model L-1011 Airplane

4. Removal/Installation of Drain Mast

A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel, zone 215, open and tag following circuit breakers:

DRAINMAST HEATER CONT (E13)

DRAINMAST HEATER AFT (E14)

DRAINMAST HEATER MID (E15)

(2) At applicable drain mast, remove screws that support drain mast.

NOTE: Some aircraft have a drain mast PN LAC 673300-101, Mfr PN 8921620G1 (Ref. Fig. 401). When this drain mast is installed, remove spacer and adapter plate with drain mast.

(3) Lower drain mast enough to disconnect electrical connector.

NOTE: Drain tube is a slip fit into aircraft receptacle and sealed with an O-ring.

B. Installation

(1) Verify that circuit breakers opened in Step 4A(1) are open and tagged.

(2) Check gasket on fuselage for damage. Environmental seal new gasket to fuselage, (Ref. 20-51-04).

(3) Replace O-ring in receptacle. Lubricate O-ring.

(4) Connect electrical connector.

(5) Fit tube in drain mast into receptacle.

NOTE: When the drain mast is LAC PN 673300-101, Mfr PN 8921620G1, install adapter plate with four mounting screws (Ref. Fig. 401) before installing drain mast and spacer.

(6) Install drain mast to fuselage.

(7) Remove tags and close circuit breakers opened in Step 4A(1).

R 5. Removal/Installation of Receptacle Heater

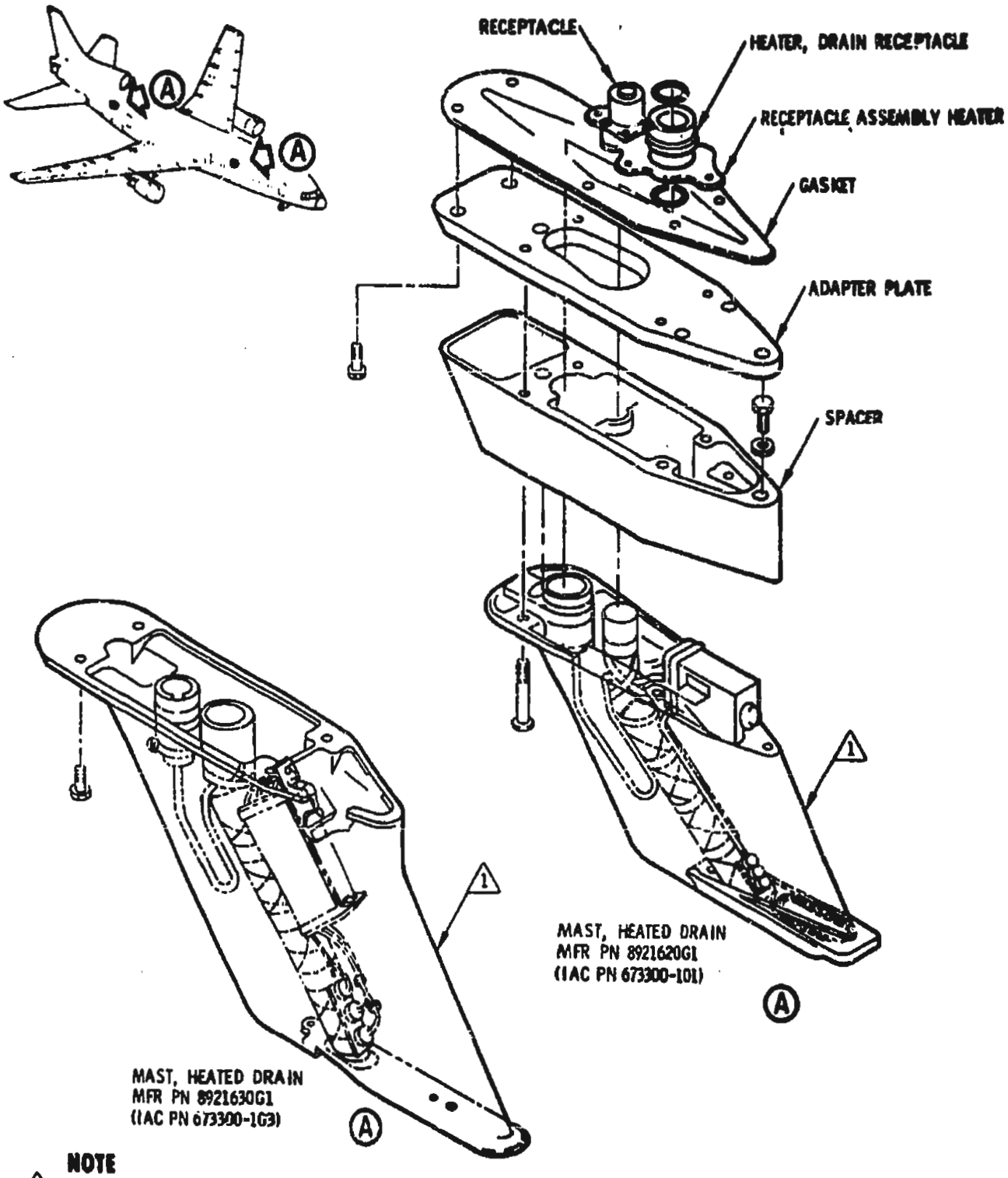
A. Removal

(1) On Flight Engineer/Second Officers overhead circuit breaker panel, zone 215, open and tag following circuit breakers:

DRAINMAST HEATER CONT (E13)

DRAINMAST HEATER AFT (E14)

DRAINMAST HEATER MID (E15)



NOTE

1. DO NOT DISASSEMBLE MAST OR MAST DRAIN HEATERS. RETURN TO MANUFACTURER FOR OVERHAUL

M1-0000-30-5092

R Drain Mast - Removal and Installation
R Figure 401

(2) Gain access to applicable receptacle through access panel, 136CT in galley for mid drain mast, 166NT in aft cargo compartment for aft drain mast.

(3) Identify and cut heater wires at heater.

(4) Remove screw clamping heater to receptacle and remove heater.

B. Installation

(1) Place heater around receptacle and tighten screw to clamp heater to 10-14 in. lbs.

(2) Test heaters for continuity after installation and before connecting wires. Check between the red leads for heater number 1. Check between the brown leads for heater number 2. The resistance range is 3 to 4 ohms.

R (3) Splice heater wires to aircraft wiring as identified in
R Step 5A(3).

(4) Replace access panel 136CT or 166NT as applicable.

(5) Remove tags and close circuit breakers opened in Step 4A(1).

R DRAIN MAST HEATER - ADJUSTMENT AND TEST

R 1. General

R This procedure is used to verify the operation of both the mid
R and aft drain mast heaters.

R 2. Equipment and Materials

R Plastic container with 10 inch min inside diameter

R 3. Referenced Procedures

R 24-41-00 External Power/Ground Service System - Maintenance
R Practices

R 4. Adjustment/Test

R A. Operational Test

R (1) Turn on electrical power (Ref. 24-41-00).

R (2) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, verify that circuit
R breaker DRAINMAST HEATER - CONT (E13) is closed.
R Verify that circuit breakers DRAINMAST HEATER - AFT
R (E14) and MID (E15) are open.

R (3) Prepare plastic container of ice water. Immerse lower
R 3 to 4 inches of mid drain mast in ice water.

R (4) On Flight Engineer/Second Officers WASTE WATER panel,
R depress (latch in) DRAIN MAST HTRS - MID 1 - MID 2
R switchlight. Verify that MID 1 light comes on within a
R few minutes.

R NOTE: The light is operated by a thermal switch.
R Delay in operation of the light is a function of
R the difference in temperature between the
R ambient and the ice water.

R (5) Close circuit breaker DRAINMAST HEATER - MID (E15).
R Verify that MID 1 light goes off within 5 minutes.

R (6) Open circuit breaker DRAINMAST HEATER - MID (E15).

R (7) Depress (release) MID 1 - MID 2 switchlight. Verify
R that MID 2 light comes on within a few minutes.

R (8) Close circuit breaker DRAINMAST HEATER - MID (E15).
R Verify that MID 2 light goes off within 5 minutes.

R (9) Remove ice water from mid drain mast.

R (10) Repeat Steps 4A(3) through 4A(9) at aft drain mast
R using DRAIN MAST HTRS - AFT 1 - AFT 2 switchlight and
R DRAINMAST HEATER - AFT (E14) circuit breaker.

R (11) Turn off electrical power (Ref. 24-41-00).

WASTE SYSTEM BALL VALVE HEATER BLANKET - REMOVAL AND INSTALLATION

1. General

The following removal and installation procedure is applicable for the forward and the aft waste tank ball valve heaters. One waste tank is in the forward waste compartment, zone 113, and the other is in the aft waste compartment, zone 167, (Ref. Fig. 401 and 402).

2. Equipment and Materials

Ohmmeter, Simpson Model 260 or equivalent

3. Referenced Procedure

25-51-06 Aft Cargo Compartment Liner Panels - Removal and Installation

4. Removal/Installation

A. Removal

R (1) On galley right circuit breaker panel, zone 130, open
R and tag circuit breaker WASTE - SYS - HTR (A1).

(2) For forward waste system compartment access, open forward electronic service center access door 112AB. Remove waste tank shroud in forward waste system compartment, zone 113.

(3) For aft waste system compartment access, open aft cargo compartment door 824. Remove aft cargo compartment aft liner panel (Ref. 25-51-06).

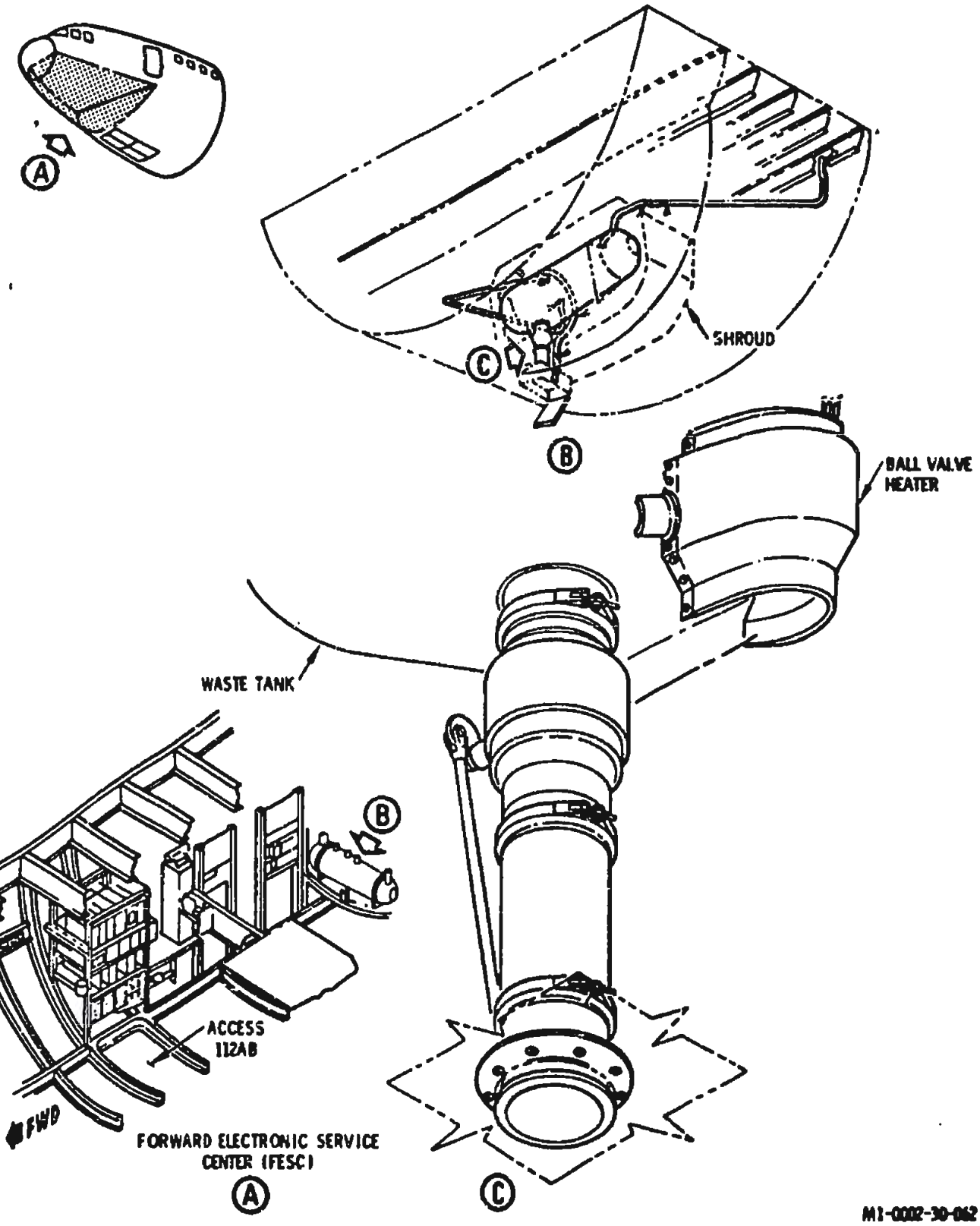
(4) Disconnect and tag ball valve heater blanket wires at terminal module.

R CAUTION: KEEP FLEXING OF HEATER BLANKET TO A MINIMUM.

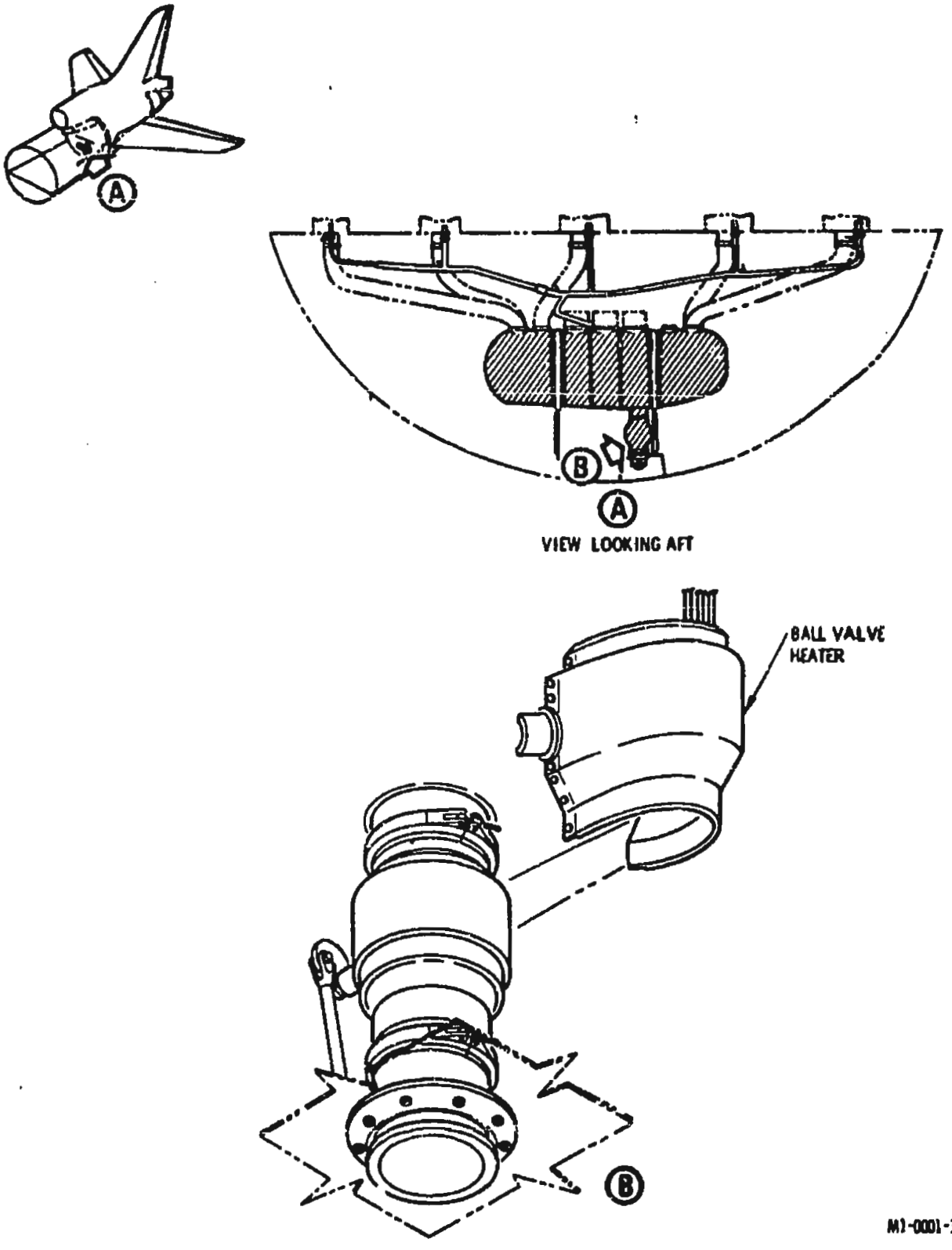
(5) Unlace and remove heater blanket.

B. Installation

(1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.



R Forward Waste System Ball Valve Heater Blanket
R Removal and Installation
R Figure 401



R Aft Waste System Ball Valve Heater Blanket
R Removal and Installation
R Figure 402

(2) Wrap heater blanket around ball valve and lace closed.

(3) Test heaters for continuity after installation and before connecting wires. Check between the green and black leads for primary heater circuit. Check between the yellow and brown leads for the secondary heater circuit. The resistance range is 330 to 407 ohms.

(4) Remove tags and connect heater wires to terminal module.

(5) Install waste tank shroud or aft cargo compartment liner panel (Ref. 25-51-06), as applicable.

(6) Close and secure compartment door.

(7) Remove tag and close circuit breaker opened in Step 4A(1).

FORWARD WASTE SYSTEM DRAIN DUCT HEATER BLANKET REMOVAL AND INSTALLATION

NOTE: Forward Waste System Drain Duct Heater may be de-activated by Alert SB30-A045.

1. Equipment and Materials

   Ohmmeter, Simpson Model 260 or equivalent

2. Removal/Installation

   A. Removal

      (1) On galley right circuit breaker panel zone 130, open and tag circuit breaker WASTE SYS HTR (A1).

      (2) Open forward electronic service center access door 112AB.

      (3) In forward waste system compartment, zone 113, remove waste tank shroud (Ref. Fig. 401).

      (4) Disconnect and tag drain duct heater blanket wires at terminal module.

      CAUTION: KEEP FLEXING OF HEATER BLANKET TO A MINIMUM.

      (5) Unlace and remove heater blanket.

   B. Installation

      (1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

      CAUTION: KEEP FLEXING OF HEATER BLANKET TO A MINIMUM.

      (2) Wrap heater blanket around drain duct and lace closed.

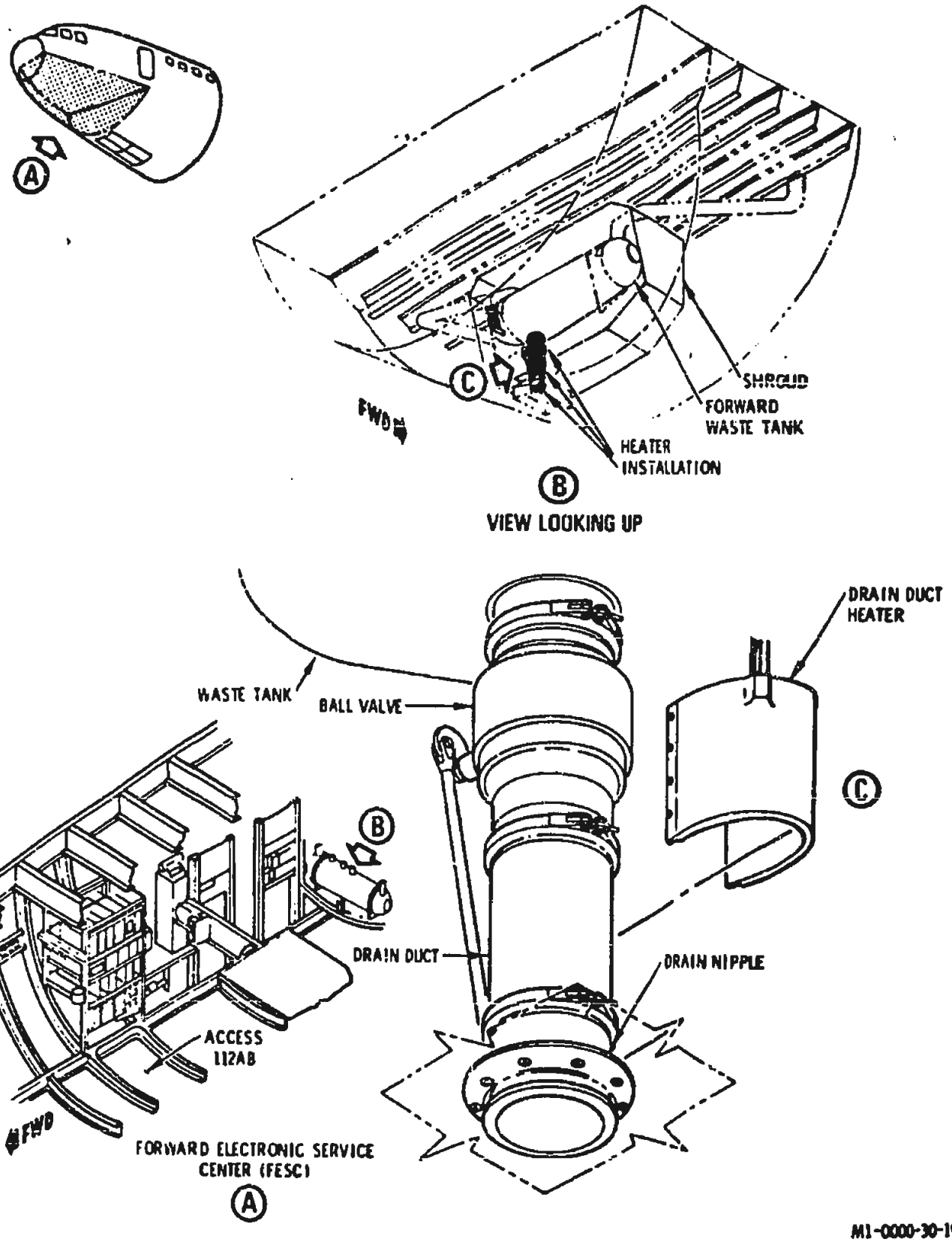
      (3) Test heaters for continuity after installation and before connecting wires. Check between the green and black leads for the primary heater. Check between the yellow and brown leads for the secondary heater circuit. The resistance range is 351 to 429 ohms.

      (4) Remove tags and connect heater wires to terminal module.

      (5) Install waste tank shroud.

(6) Close and secure forward electronic service center access door 112AB.

(7) Remove tag and close circuit breaker opened in Step 2A(1).



R Forward Waste System Drain Duct Heater Blanket
R Removal and Installation
R Figure 401

POTABLE WATER DRAIN VALVE HEATER BLANKET REMOVAL AND INSTALLATION

1. Equipment and Materials

Bulk fiber glass insulation material, one-half-inch thick, MIL-B-5924, Type I, or equivalent

Bulk covering, LAC Spec C-22-1254B, Type I, or equivalent

Tape, 2 inches wide, pressure-sensitive, Orcon OT-2, or equivalent

Ohmmeter, Simpson Model 260 or equivalent

2. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 130, open and tag circuit breaker WASTE SYS HTR (A1).

(2) On galley floor, remove aft right panel 136ET to gain access to drain valve (Ref. Fig. 401).

(3) Remove tape, cover, and insulation from drain valve heater blanket.

(4) Disconnect and tag heater blanket wires at terminal module.

R CAUTION: KEEP FLEXING OF HEATER BLANKET TO A MINIMUM.

(5) Locate seam on heater blanket; pull heater blanket open and remove.

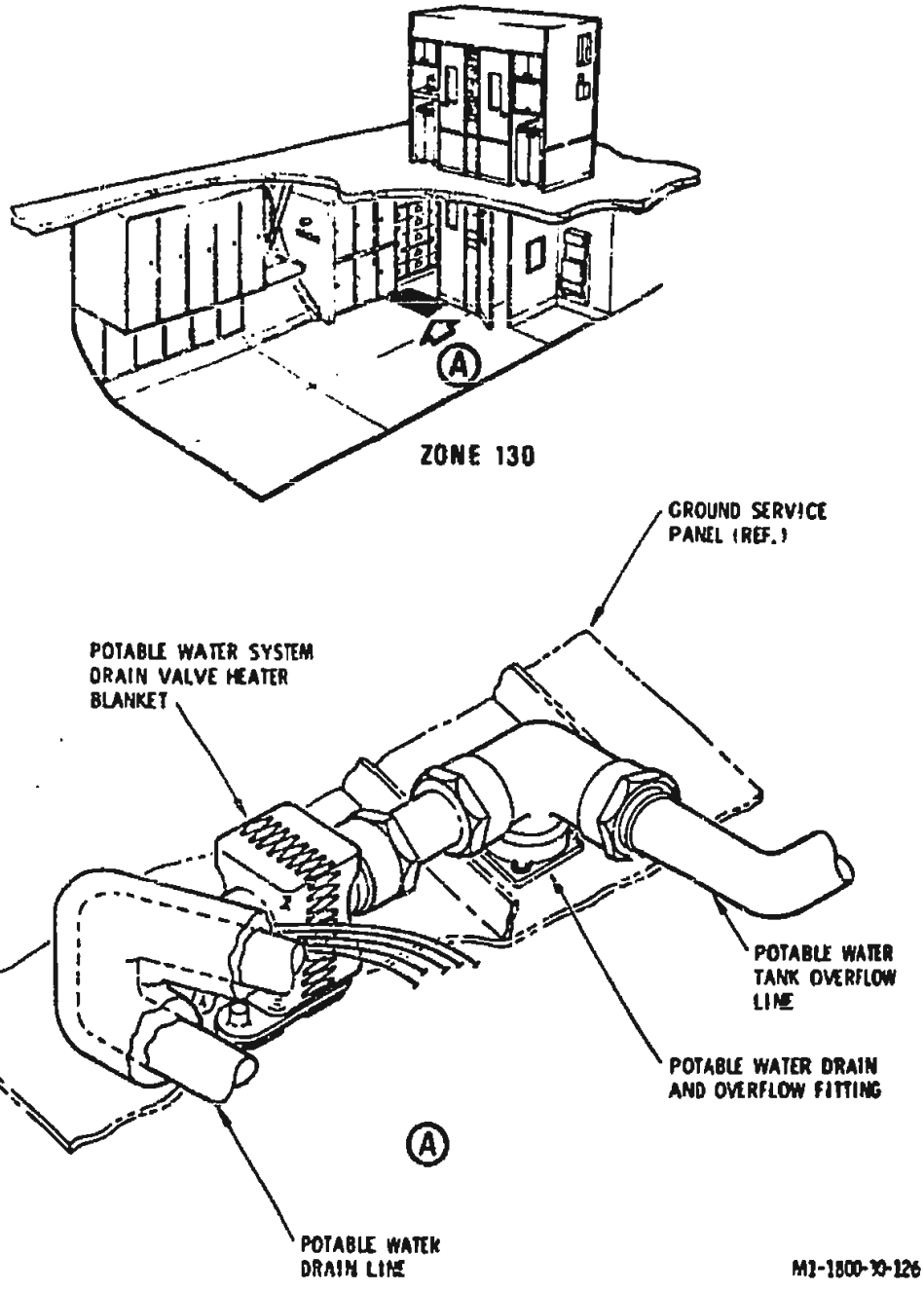
B. Installation

(1) Verify that circuit breaker opened in Step 2A(1) is open and tagged.

(2) Wrap heater blanket around drain valve and press seam closed.

(3) Remove tags and connect heater blanket wires to terminal module.

(4) Install insulation and cover on heater blanket and seal seam with tape.



R Potable Water Drain Valve Heater Blanket
R Removal and Installation
R Figure 401

R (5) Replace floor panels.

R (6) Remove tag and close circuit breaker opened in Step 2A(1).

WASTE SYSTEM DRAIN NIPPLE HEATERS REMOVAL AND INSTALLATION

1. General

NOTE: Waste system drain nipple heaters have been deactivated on aircraft 001-031. The system will be reactivated by SB30-050 when incorporated. Aircraft 032-999 will be delivered with nipple heaters as shown in Figures 401 and
R 402.

The following removal and installation procedure is applicable for the forward and aft waste tank drain nipple heaters. One waste tank is in the forward waste compartment, zone 113, the other is in the aft waste compartment, zone 167, (Ref. 401 and 402).

2. Equipment and Material

Ohmmeter, Simpson Model 260 or equivalent

3. Referenced Procedure

6-40-00	Exterior Access Doors and Panels
6-50-00	Interior Access Doors and Removable Panels
25-51-06	Cargo Compartment Liner Panels - Removal and Installation

4. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 130, open and tag circuit breaker WASTE SYS HTR (A1).

(2) For access to forward waste system compartment, open forward electronic service center access door 112AB and remove waste tank shroud in zone 113 (Ref. 6-40-00, 6-50-00).

(3) For access to aft waste system compartment, open aft cargo compartment door 824 and remove aft liner panel (Ref. 25-51-06).

(4) Disconnect and tag drain heater blanket wires at terminal module.

CAUTION: KEEP FLEXING OF HEATER BLANKET TO A MINIMUM.

(5) Unlace and remove heater blanket.

B. Installation

(1) Verify circuit breaker opened in Step 4A(1) is still open and tagged.

(2) Install heater blanket and lace closed.

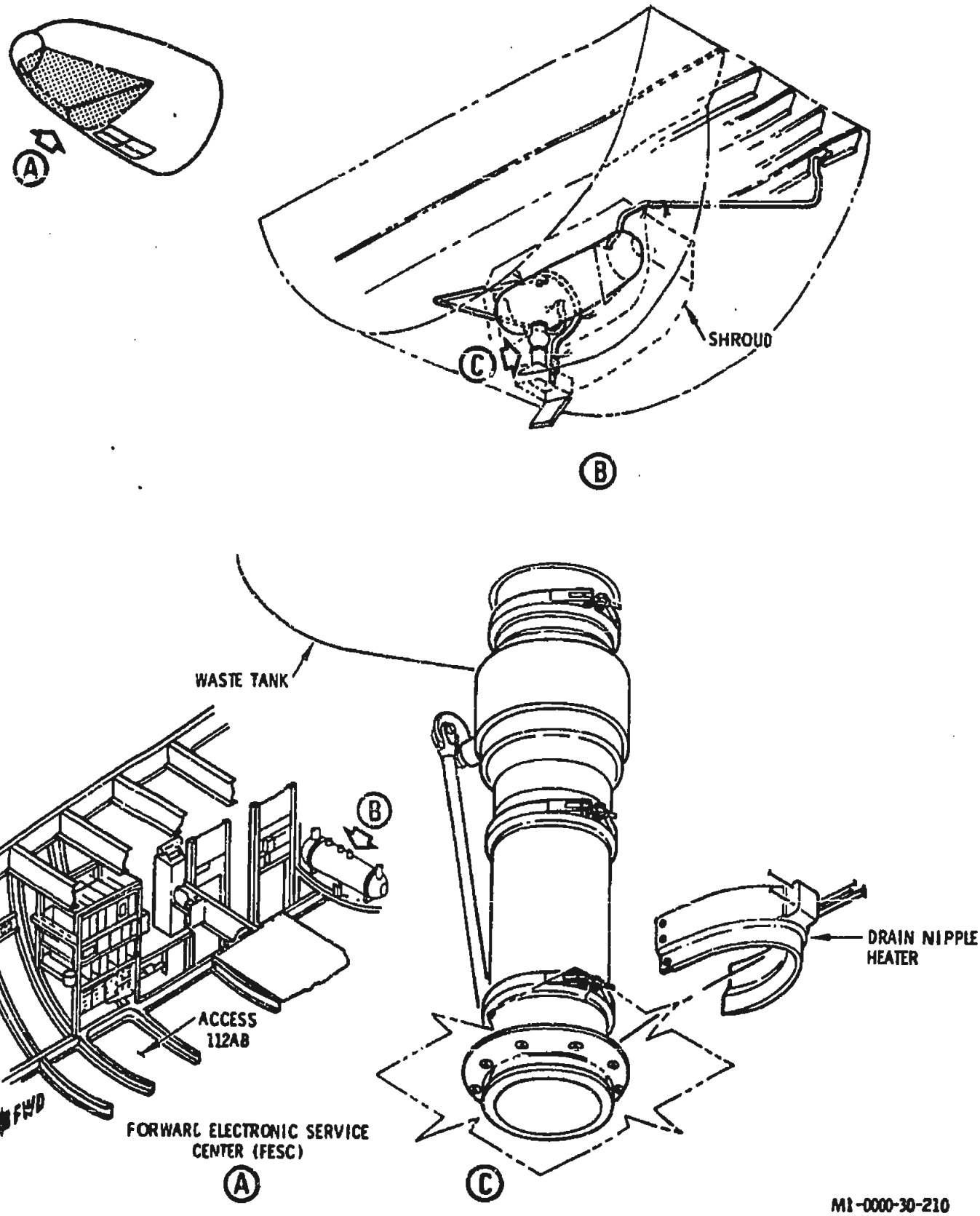
(3) Test heaters for continuity after installation and before connecting wires. Check between green and black leads for the primary heater circuit. Check between yellow and brown leads for the secondary heater circuit. The heater resistance range is 159 to 211 ohms.

(4) Remove tags and connect heater blanket wires to terminal module.

(5) Install waste tank shroud or aft cargo compartment liner panel as applicable (Ref. 25-51-06).

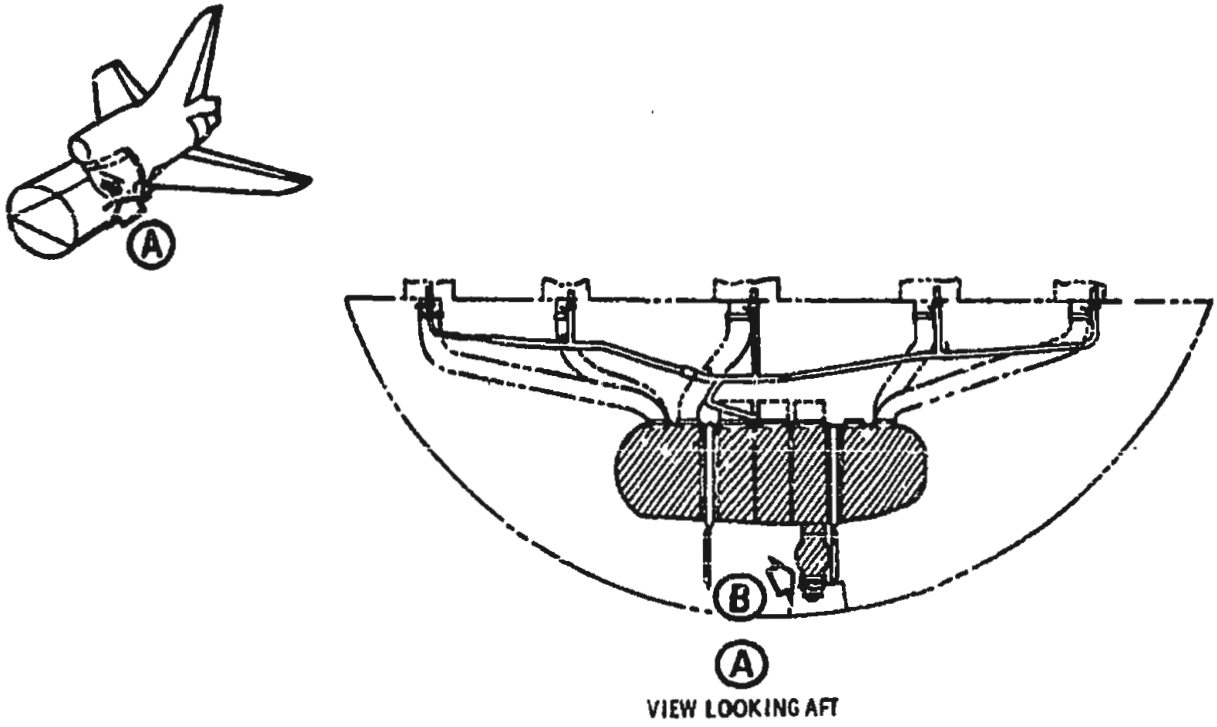
(6) Close and secure compartment door.

(7) Remove tag and close circuit breaker opened in Step 4A(1).



Forward Waste Drain Nipple Heater
Removal and Installation
Figure 401

EFFECTIVITY: 001-032 WITHOUT SB30-050



Aft Waste Drain Nipple Heater - Removal and Installation
Figure 402

WASTE SYSTEM DRAIN NIPPLE HEATERS - REMOVAL AND INSTALLATION

1. General

The following procedure is applicable to both the forward and aft waste system drain nipple heaters. Both are a flange type heater sandwiched between the drain cap assembly and the waste service panel. Access to the heaters is through either the forward or aft waste service panel. Both heaters are removed from outside the aircraft after first disconnecting the heater wiring inside the aircraft.

Wiring for the forward heater is disconnected from a terminal module and a ground stud. These are located near the forward waste tank ball valve in the aft Forward Electronic Service Center (FESC).

Wiring for the aft heater is disconnected from terminal modules near the aft waste tank ball valve. Access is through liner panel 161AL in the aft cargo compartment.

2. Equipment and Materials

Ohmmeter, Simpson Model 260 or equivalent

O-ring, Sargent Industries Inc. - Stillman Seal Division, P/N SZ7348 or equivalent

Tie wraps, Thomas and Betts Co., P/N TY44M or equivalent

3. Referenced Procedures

	6-50-00	Interior Access Doors and Removable Panels
	12-15-11	Waste Disposal System - Servicing
	20-36-01	Single T-Bolt V-Band Coupling - Removal and Installation
	25-51-06	Cargo Compartment Liner Panels - Removal and Installation
R	WM20-21-00	Wire Routing - Standard Practices
R	WM30-71-01	Water Line Heater Blankets CTR and AFT
R	WM30-71-02	Water Line Heater Blankets (FWD COMPT)

4. Removal/Installation - Forward Heater

A. Removal

(1) Drain and flush waste tank (Ref. 12-15-11).

(2) On Flight Engineer/Second Officer overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers FWD LAV FLUSH PUMP NO. 1, NO. 2 and NO. 3 (B3, B6, B9).

(3) On galley right circuit breaker panel, zone 130, open and tag circuit breaker WASTE SYS HTR (A1).

(4) In Forward Electronic Service Center (FESC), zone 113, remove forward cover from waste tank shroud.

(5) Remove lower V-band clamp (Ref. 20-36-01) from waste drain assembly (Ref. Fig. 401).

R (6) Locate terminal board 9811-TB1142 near waste drain
R assembly and remove wire from terminal 15A (Ref.
R WM30-71-02).

R (7) Locate ground stud 9811-GF364 forward of waste drain
R assembly and remove wire from stud 2 (Ref. WM30-71-02).

(8) Separate wires from harness and stow near waste drain assembly so they can be pulled through from outside aircraft.

(9) At forward waste service panel, zone 113, remove 8 screws from drain cap assembly.

CAUTION: HEATER WIRES ARE PART OF HEATER, BE CAREFUL WHEN REMOVING DRAIN CAP ASSEMBLY.

(10) Remove (as one assembly) drain cap assembly, heater, phenolic gasket, rubber gasket and heater wires.

(11) Carefully separate heater from drain cap assembly and gaskets.

(12) Remove and discard O-ring from drain cap assembly.

B. Installation

(1) Verify circuit breakers opened in Steps 4A(2) and (3) are opened and tagged.

CAUTION: BE CAREFUL NOT TO DAMAGE HEATER WIRES DURING REASSEMBLY.

(2) Install heater on waste drain cap assembly with wires facing away from flange (Ref. Fig. 401).

(3) Insert heater wires through odd hole in phenolic gasket and install gasket on drain cap assembly.

(4) Insert heater wires through odd hole in rubber gasket and install gasket on drain cap assembly.

(5) Install new O-ring in drain cap assembly.

CAUTION: ENSURE DRAIN CAP ASSEMBLY IS INSTALLED WITH CAP HINGE AFT. CAP PROJECTING TANG MUST LOCK DRAIN VALVE HANDLE WHEN CLOSED.

(6) Insert heater wires through odd hole in service panel and align screw holes to ensure drain cap assembly is installed with hinge aft.

(7) Position (as one assembly) drain cap assembly, heater, phenolic gasket and rubber gasket on waste service panel.

CAUTION: VERIFY HEATER WIRES ARE NOT PINCHED BETWEEN ANY PARTS.

(8) Install and tighten 8 screws.

(9) In FESC, install and tighten V-band clamp (Ref. 20-36-01).

(10) Check for 110 to 132 ohms between black and green wires using an ohmmeter.

NOTE: If heater resistance is out of tolerance, recheck installation.

R (11) Locate ground stud 9811-GS364 forward of waste drain
R assembly and connect wire to stud 2 (Ref. WM30-71-02).

R (12) Locate terminal board 9811-TB1142 near waste drain
R assembly and connect wire to terminal 15A (Ref.
R WM30-71-02).

(13) Route wires and spot-tie into harness (Ref. WM20-21-00).

(14) Remove tags and close circuit breakers opened in Steps 4A(2) and (3).

(15) Reinstall forward waste tank shroud cover.

5. Removal/Installation - Aft Heater

A. Removal

(1) Drain and flush waste tank (Ref. 12-15-11).

(2) On cabin overhead circuit breaker panel CB4, zone 254, open and tag the following circuit breakers:

FLUSH PUMP AFT LAV 1 (J2)

FLUSH PUMP AFT LAV 2 (H8)

FLUSH PUMP, AFT LAV 3 (H17)

HEATERS WASTE SYS (H15)

(3) In aft cargo compartment, zone 167, remove aft liner panel 161AL (Ref. 25-51-06).

(4) Remove V-band clamp (Ref. 20-36-01) from lower end of waste drain ball valve (Ref. Fig. 402).

R (5) Locate terminal board 9811-TB810 on outboard side of
R waste tank support and remove wire from terminal 4A
R (Ref. WM30-71-01).

R (6) Locate ground stud 9811-GS287 near waste drain assembly
R and remove wire from stud 2 (Ref. WD30-71-01).

(7) Separate wires from harness and stow near waste drain assembly so they can be pulled through from outside aircraft.

(8) At aft waste service panel, zone 167, remove 8 screws from drain cap assembly.

CAUTION: HEATER WIRES ARE PART OF HEATER, BE CAREFUL WHEN REMOVING DRAIN CAP ASSEMBLY.

(9) Remove (as one assembly) drain cap assembly, heater, phenolic wedge, rubber gasket and heater wires.

(10) Carefully separate heater from other components.

(11) Remove and discard O-ring from drain cap assembly.

B. Installation

(1) Verify circuit breakers opened in Step 5A(2) are open and tagged.

CAUTION: BE CAREFUL NOT TO DAMAGE HEATER WIRES DURING REASSEMBLY.

(2) Install heater on waste drain cap assembly with wires facing away from flange (Ref. Fig. 402).

(3) Insert heater wires through odd hole in wedge and install wedge on drain cap assembly.

(4) Insert heater wires through odd hole in rubber gasket and install gasket on drain cap assembly.

CAUTION: ENSURE DRAIN CAP ASSEMBLY IS INSTALLED WITH CAP HINGE FORWARD. CAP PROJECTING TANG MUST LOCK DRAIN VALVE HANDLE WHEN CLOSED.

(5) Install new O-ring in drain cap assembly.

(6) Insert heater wires through odd hole in service panel and align screw holes to ensure drain cap assembly is installed with hinge forward.

(7) Position (as one assembly) drain cap assembly, heater, phenolic wedge and rubber gasket on waste service panel.

CAUTION: VERIFY HEATER WIRES ARE NOT PINCHED BETWEEN ANY PARTS.

(8) Install and tighten 8 screws.

NOTE: Install 4 short screws through holes in inboard half of drain cap flange (toward aircraft centerline) and 4 long screw in outboard half.

(9) In aft cargo (waste) compartment, install and tighten V-band clamp (Ref. 20-36-01).

(10) Check for 110 to 132 Ohms between black and green wires using an ohmmeter.

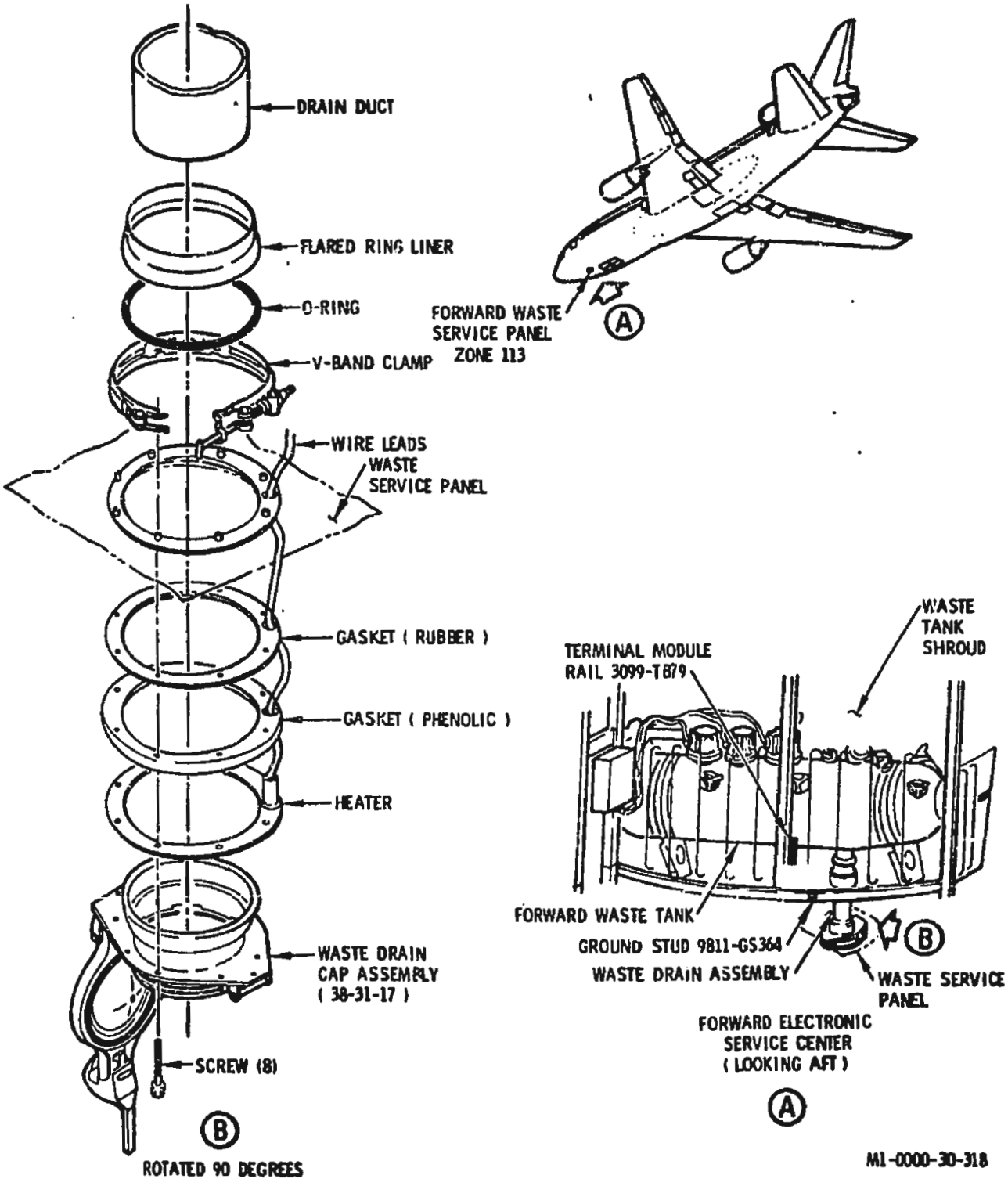
NOTE: If heater resistance is out of tolerance, recheck installation.

R (11) Locate terminal board 9811-TB810 on outboard side of
R waste tank support and connect wire to terminal 4A and
R locate ground stud 9811-GS287 near waste drain assembly
R and connect wire to stud 2 (Ref. 30-71-01).

(12) Route wires and spot-tie into harness (Ref. WM20-21-00).

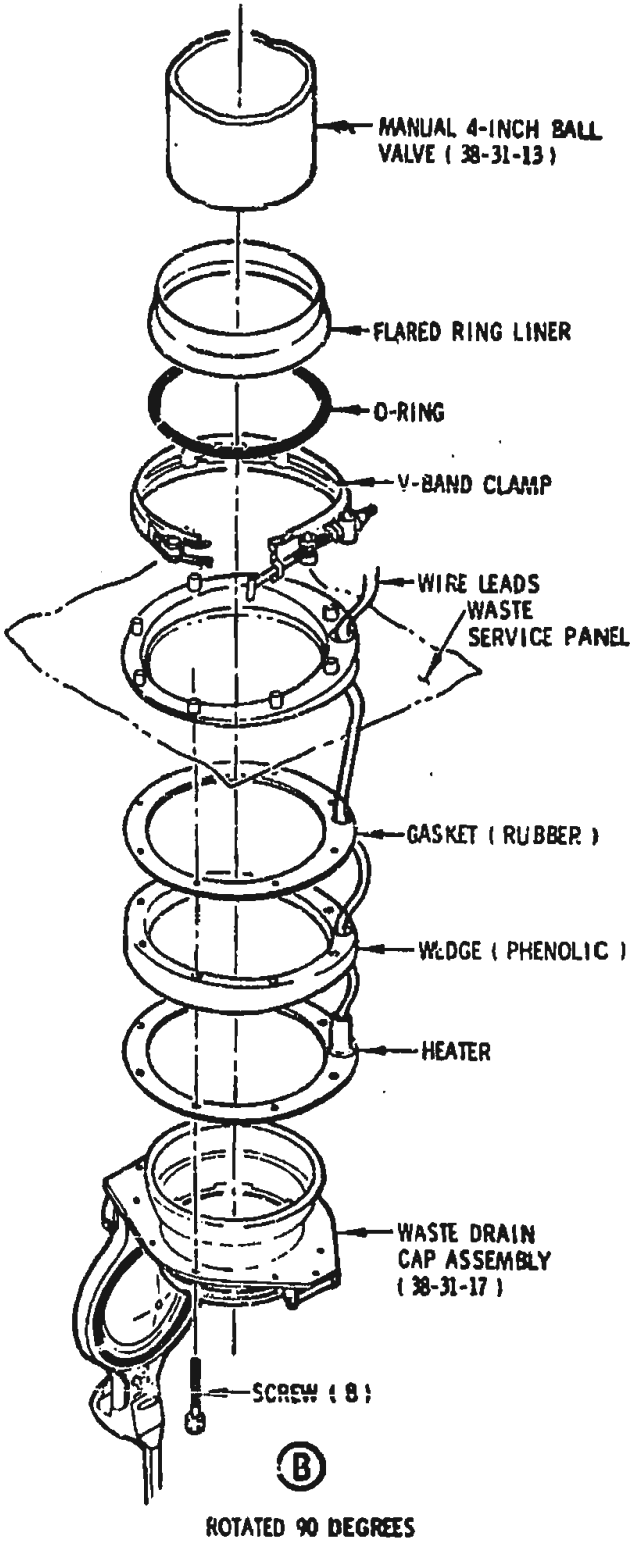
(13) Remove tags and close circuit breakers opened in Steps 5A(2).

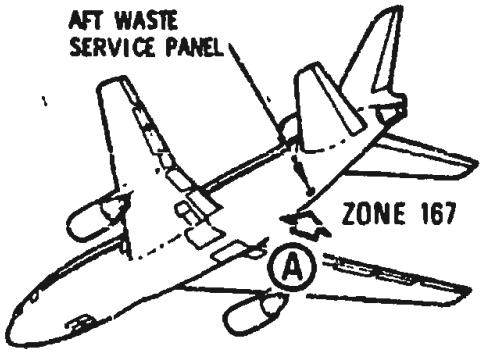
(14) Reinstall cargo compartment liner panel.

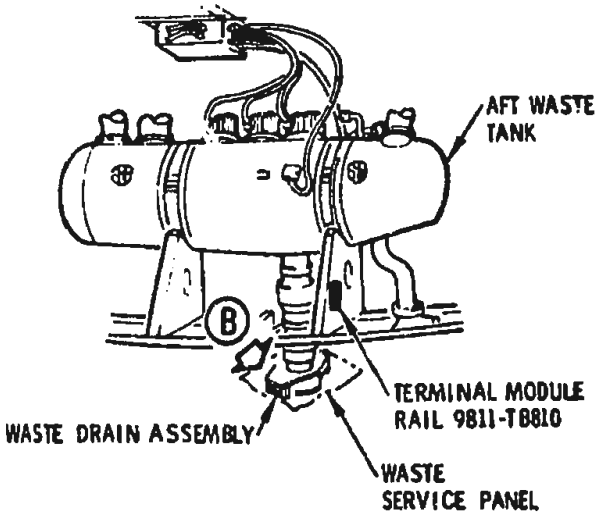


R Forward Waste Drain Nipple (Flange) Heater
R Removal and Installation
R Figure 401

R EFFECTIVITY: 001-031 WITH SB30-050 AND 032-999
R







AFT CARGO COMPARTMENT
(LOOKING AFT BEHIND AFT LINER PANEL)

A

M1-0000-30-319

R Aft Waste Drain Nipple (Flange) Heater
R Removal and Installation
R Figure 402

R EFFECTIVITY: 001-031 WITH SB30-050 AND 032-999
R

0038

WATER SERVICE PANEL FITTINGS HEATER BLANKET REMOVAL AND INSTALLATION

1. General

The potable water service panel fittings heater blanket is an assembly made up of a heater control, a drain fitting heater blanket and a fill/overflow fitting heater blanket.

2. Equipment and Materials

Bulk fiber glass insulation material, one-half-inch thick, MIL-B-5924, Type I, or equivalent

Bulk covering, LAC Spec C-22-1254B, Type I, or equivalent

Tape, 2 inches wide, pressure-sensitive, Orcon OT-2, or equivalent

Wire, 0.032-inch diameter, Fed Spec QQ-W-423, or equivalent

Ohmmeter, Simpson Model 260 or equivalent

3. Removal/Installation

A. Removal

R (1) On galley right circuit breaker panel, zone 130, open and tag circuit breaker WATER SYSTEM - HEATER - LINE (B2).

R (2) On galley on floor, remove aft right panel 136ET to R obtain access to potable water service panel fittings R (Ref. Fig. 401).

(3) Remove tape, cover, and insulation from heater blankets.

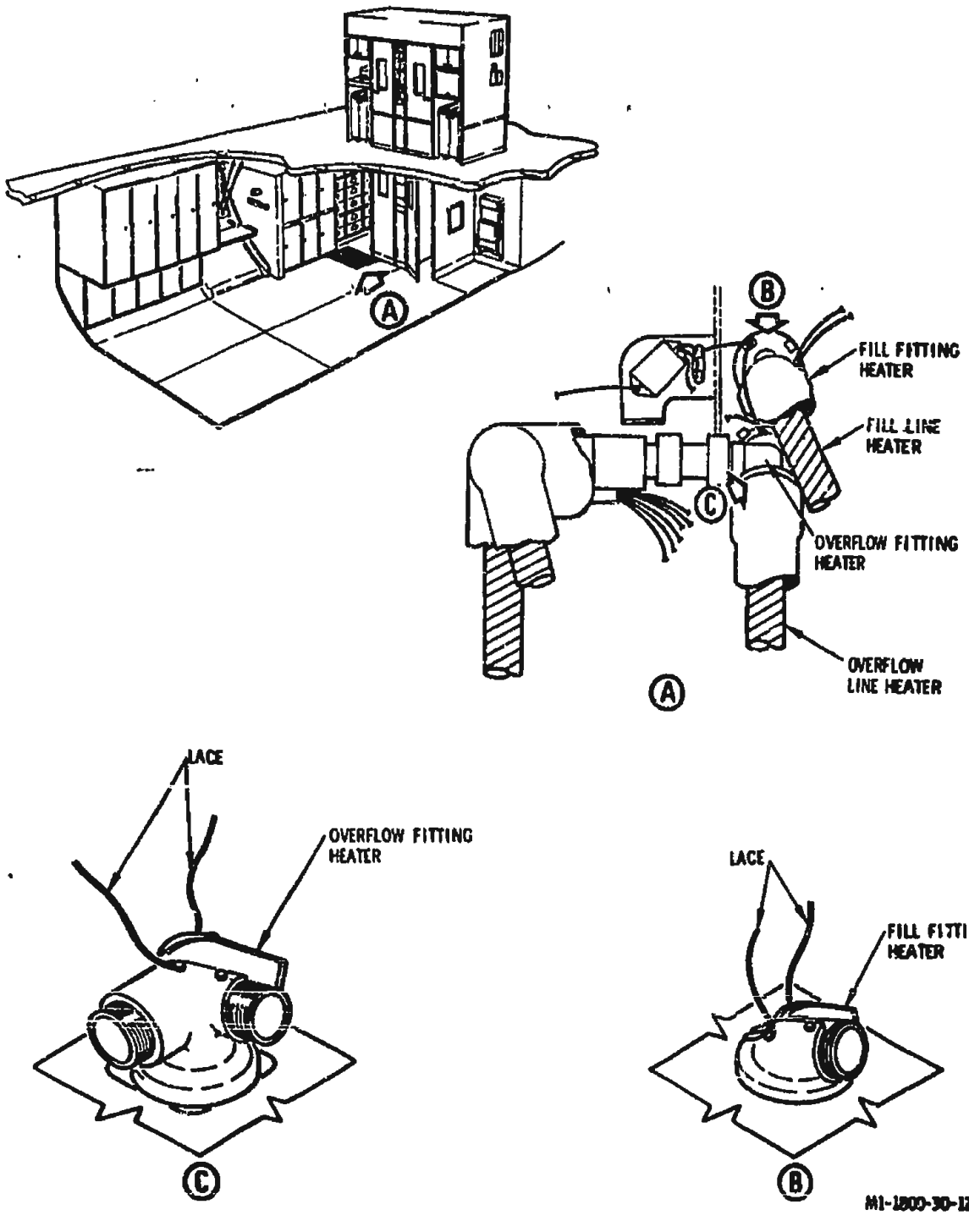
(4) Disconnect and tag electrical wires at terminal module and ground stud.

(5) Remove hardware attaching control unit to aircraft.

CAUTION: KEEP FLEXING OF HEATER BLANKETS TO A MINIMUM.

(6) Unlace and remove heater blankets.

B. Installation



Potable Water Service Panel Fittings Heater Blanket - Removal and Installation
Figure 401

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Attach control unit to aircraft with attaching hardware.

(3) Wrap heater blankets around service panel fittings and lace closed.

(4) Test heater for continuity after installation and before connecting wires. Check between the blue and black leads for a resistance range of 260 to 324 ohms.

(5) Remove tags and connect electrical wires.

(6) Install insulation and cover on heater blankets and seal seams with tape.

(7) Replace floor panels.

(8) Remove tag and close circuit breaker opened in Step 3A(1).

AFT LAVATORY UNDERFLOOR HEAT CONTROL VALVE REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Protective Gloves

Omniseals (Ref. Fig. 401)

2. Referenced Procedure

25-51-06 Aft Cargo Compartment Liner Panels - Removal and Installation

3. Removal/Installation

A. Removal

WARNING: FLIGHT ENGINEER/SECOND OFFICERS (FE/SO) BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS MUST BE TAGGED TO PREVENT SYSTEM OPERATION UNTIL COMPLETION OF PROCEDURE.

RECENT OPERATION OF AIRCRAFT PNEUMATIC SYSTEM WILL REQUIRE PRECAUTIONS AGAINST DANGEROUSLY HIGH TEMPERATURES. PROTECTIVE GLOVES SHOULD BE USED WHEN REQUIRED.

(1) On galley left circuit breaker panel, zone 131, open and tag circuit breaker HEAT - UNDERFLOOR - LAV AFT (B19).

(2) Remove aft cargo compartment panel to gain access to left side of aft waste compartment, zone 167 (Ref. 25-51-06).

(3) Remove electrical connector from heat control valve (Ref. Fig. 401).

CR (3A) Remove insulation from the valve and surrounding area.

(4) Remove four screws and nuts attaching control valve to
CR adapter and bracket (May be necessary to disassemble
CR tubing or remove bracket mounting bolts to remove
CR attaching screws).

(5) Remove valve and O-rings.

B. Installation

WARNING: VERIFY THAT TAGS PREVIOUSLY INSTALLED ON FE/SO BLEED AIR AND APU CONTROL PANELS AND THE THREE HIGH-PRESSURE GROUND AIR CONNECTIONS ARE IN PLACE.

(1) Verify that circuit breaker opened in Step 3A(1) is open and tagged.

(2) Install heat control valve and omniseals (O-rings) and secure with four screws and nuts.

CR (2A) Reassemble tubing and/or mounting brackets as required.

(3) Connect electrical connector.

CR (3A) Reinstall insulation around valve and surrounding area.

(4) Remove tag and close circuit breaker opened in Step 3A(1).

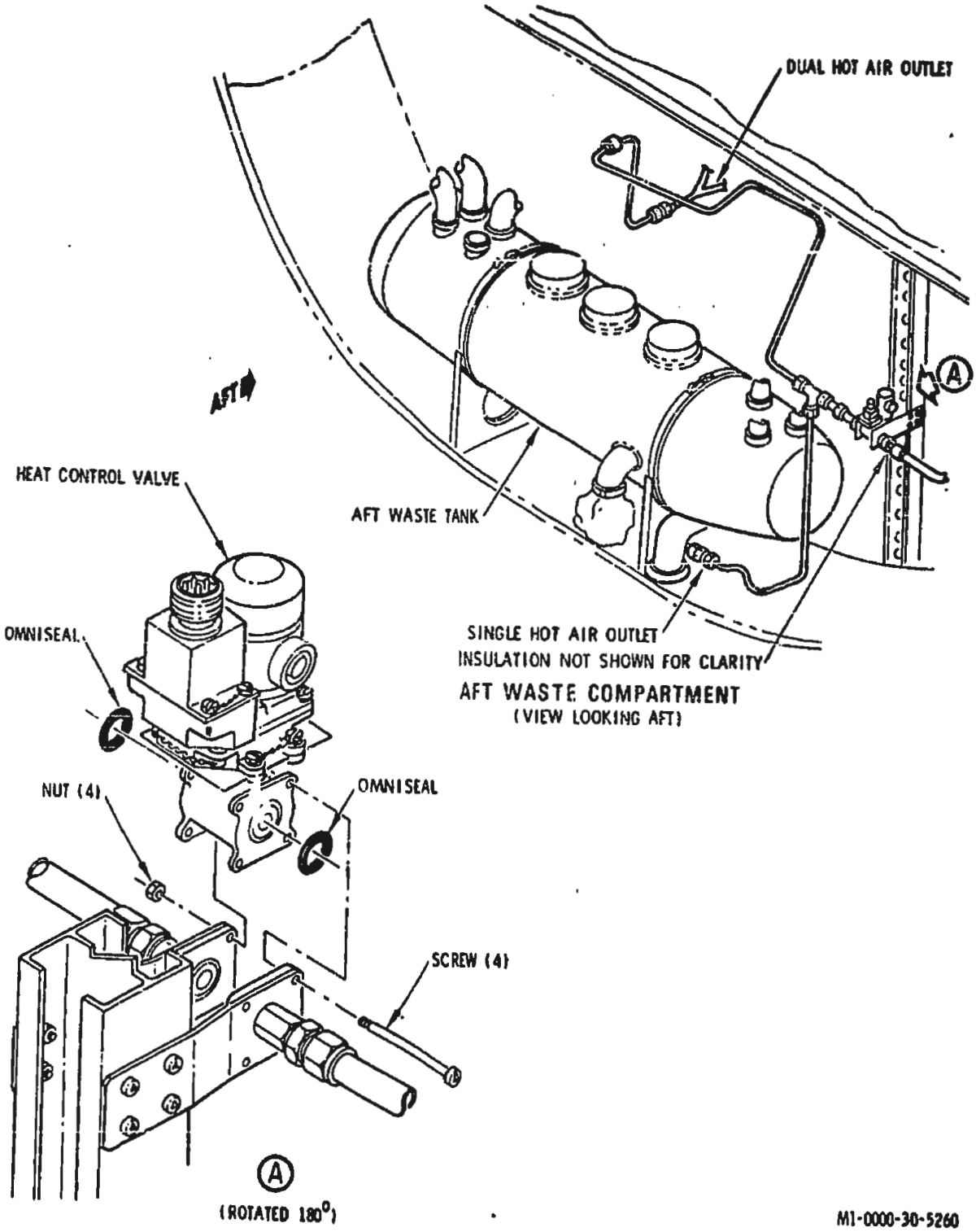
(5) Check system operation as follows:

(a) With pneumatic duct pressurized, check for air at hot air outlets. At temperature above 60 degrees F, heat control valve should be closed (no air); below 60 degrees F, valve should be open and air discharging from hot air outlets.

(b) Apply heat or cold as required to actuate temperature switch at approximately 60 degrees F; valve should operate.

(6) Install access panel removed in Step 3A(2).

(7) Remove tags installed on bleed air and APU control panels.



CR Aft Lavatory Underfloor Heat Control Valve
CR Removal and Installation
CR Figure 401

EFFECTIVITY: ALL

001B

WATERLINE HEATERS TEST PANEL - REMOVAL AND INSTALLATION

1. General

The waterline heaters test panel is located in the mid electrical service center, zone 137. It is attached to aircraft structure at FS 943. Access to the mid electrical service center is through access doors 192K and 137AZ.

2. Referenced Procedure

30-71-00 Water/Waste System - Adjustment and Test

6-40-00 Exterior Access Doors and Panels

3. Removal/Installation

A. Removal

(1) On galley right circuit breaker panel, zone 130, open and tag circuit breakers WATER SYS - HEATER WATERLINE - FWD (D6) and AFT (D7). On galley left circuit breaker panel, zone 130, open and tag circuit breaker LIGHTING - WATER SVCE PNL (G20).

R (2) Open forward/mid/or aft compartment access door 192K
R and 137AZ (Ref. 6-40-00).

(3) Disconnect electrical cable from waterline heaters test box.

(4) Hold test box, to prevent it from falling, and remove screws attaching box to mounting bracket.

B. Installation

(1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.

(2) Attach test box to mounting bracket with attaching screws.

(3) Connect electrical cable to test box.

(4) Remove tags and close circuit breakers opened in Step 3A(1).

(5) Test waterline heaters (Ref. 30-71-00).

(6) Close and secure access door, opened in Step 3A(2).

AFT LAVATORY UNDERFLOOR TEMPERATURE SWITCH REMOVAL AND INSTALLATION

1. General

Two temperature switches are located on the post below the heat control valve in the aft waste compartment (Ref. Fig. 401). The upper switch (S5) is the 60-degree switch; the lower switch (S6) is the 110-degree overheat switch.

2. Referenced Procedure

25-51-06 Aft Cargo Compartment Liner Panels - Removal and Installation

3. Removal/Installation

A. Removal

(1) On galley left circuit breaker panel, zone 131, open and tag circuit breaker HEAT-UNDERFLOOR LAV AFT (B19).

(2) Remove aft cargo compartment panel to gain access to left side of aft cargo compartment, zone 167 (Ref. 25-51-06).

(3) Identify switch to be removed then separate wires from wire harness and disconnect at terminal block.

(4) Remove switch from mounting bracket.

(5) Remove wires from switch.

B. Installation

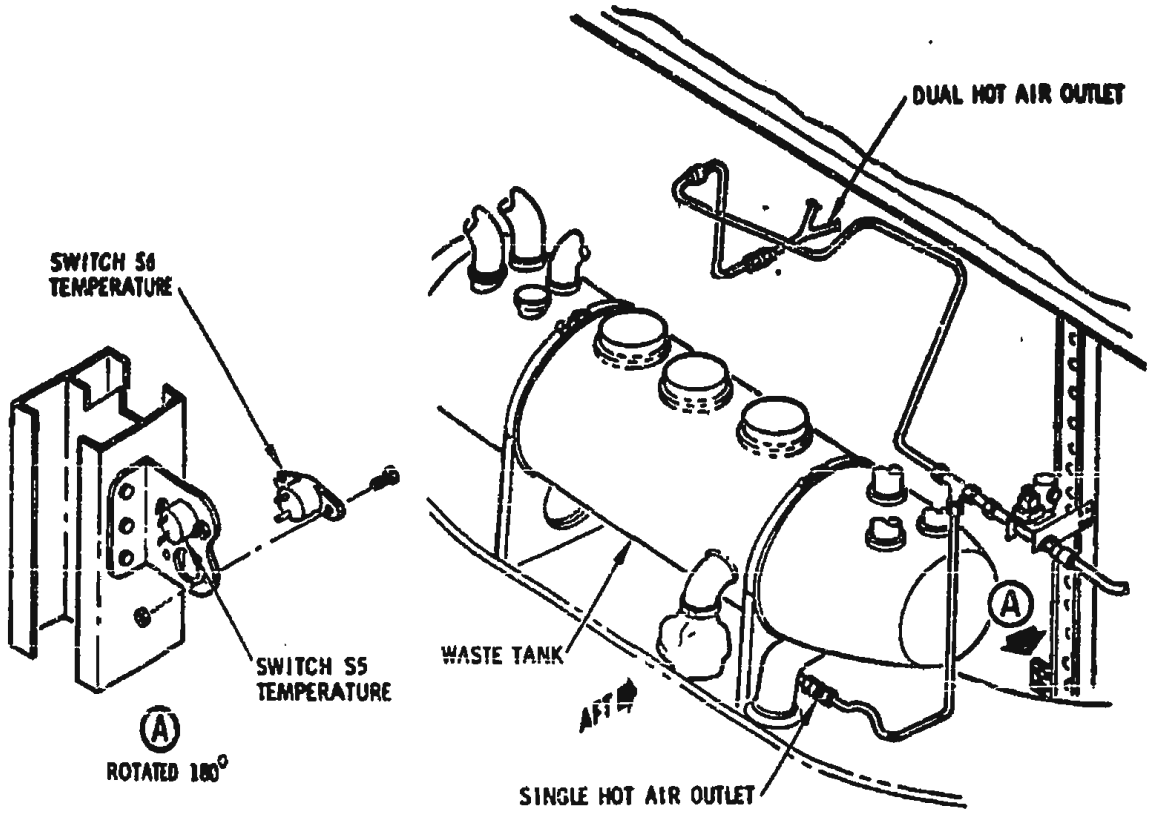
(1) Verify circuit breaker opened in Step 3A(1) is open and tagged.

(2) Attach wires to new switch by soldering.

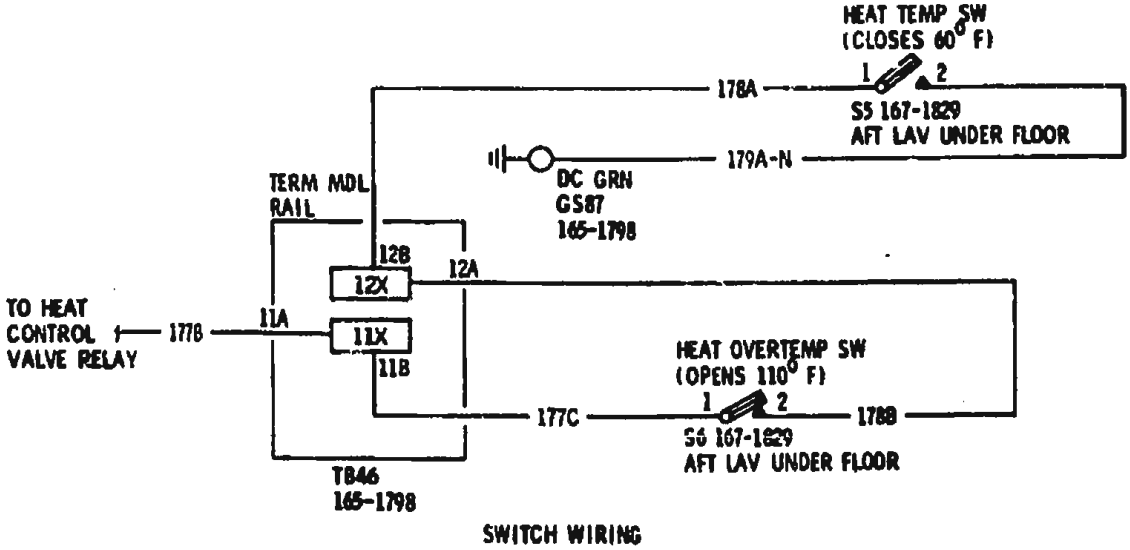
(3) Install switch on mounting bracket and secure with two screws and nuts.

(4) Connect wiring to terminal block (Ref. Fig. 401).

(5) Tie wires into wire harness.



AFT WASTE COMPARTMENT
(VIEW LOOKING AFT)



SWITCH WIRING

M1-1100-30-090

R Temperature Switches - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL
R
011B

(6) Remove tag and close circuit breaker opened in Step 3A(1).

(7) Check system operation as follows:

(a) With pneumatic duct pressurized, check for air at hot air outlets. At temperature above 60 degrees
R F, heat control valve must be closed (no air);
R below 60 degrees F, valve must be open and air discharging from hot air outlets.

(b) Apply heat or cold as required to actuate
R temperature switch S5 at approximately 60 degrees
R F; valve must operate.

R (c) Install jumper across switch S5 terminals. Verify
R heat control valve is open.

R (d) Apply heat to switch S6. Heat control valve must
R close at approximately 110 degrees F.

R (e) Remove jumper from switch S5.

(8) Install access panel, removed in Step 3A(2).